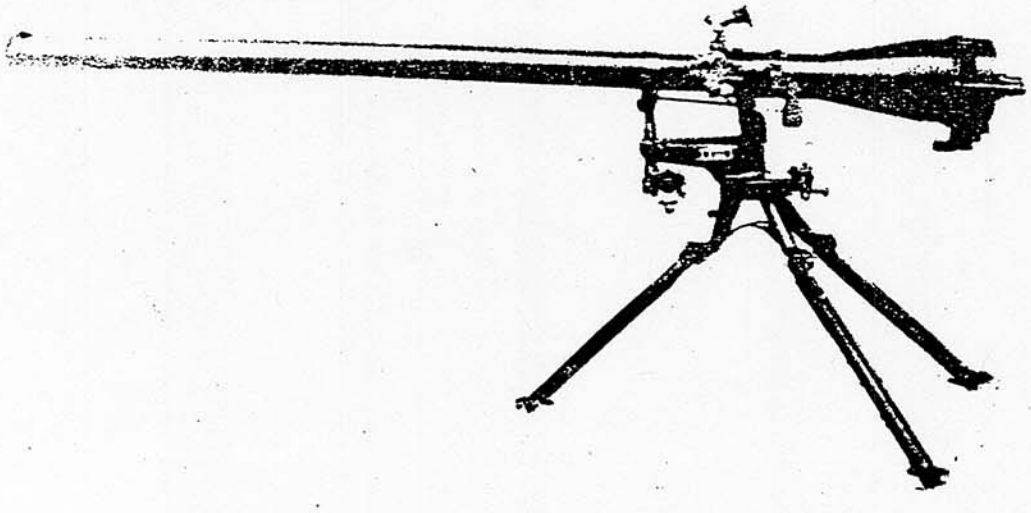
75mm RECOILLESS GUN

OPERATION INSTRUCTION



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Chapter 1 Introduction

I. Purpose and construction features

This gun is an antitank gun accompanying infantry to fight in the forward position. It is principally used to

1. Destroy enemy's light and medium tanks and other armoured vehicles;

2. Destroy enemy's light fieldwork and firing points;

3. Kill and wound exposed enemy effectives.

The gun is featured by a number of advantages, such as light weight, powerful, accurate, simple str ucture. easiness to be held on man's shoulder, flexibility in manner of firing, etc.

The barrel of the gun can be held on man's shoulder for simple firing. Its gun mount is a folding tripod which can be held on man's back, rendering the gun suitable for fighting in complicated terrain like mountains, forest, river network. paddy fields, etc.

The gun uses armour-piercing hollow charge shell and high explosive shell. In the wall of bullet case there are small holes (5) (Fig.1) and the internal surface is lined with a kraft paper cylinder, When firing, gas generated by gunpowder builds up high pressure, forcing bullet(2) to move forward while at the same time presses through the paper cylinder to inject into powder chamber (7) and eject through the four nozzles (6), thus balancing the recoil created by the forward movement of the bullet.

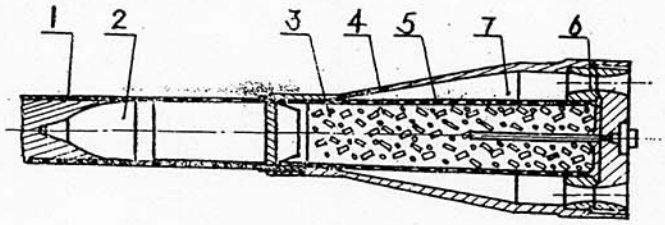


Fig.1

1.Barrel 2.Bullet 3.Bullet case 4.Breech 5.Small holes 6.Nozzle 7.Chamber

Since bursting of gunpowder at firing gives a direct shock to the surrounding air, loud sound will be created and moreover, flame of powder burning will spray out of the breech. the gunner should

not only keep himself clear of the rear of breech but also check that no people, horse or inflamable is within the dangerous area (within 60 degrees for 30 meters). Furthermore, when the flame is spraying out, a cloud of dust will be raised up in daytime and bright light will emitted at night, thus it is liable to give away ones position. There fore. it is neccessary to select position and shift to other position in time.

II. Particulars

1. Ballistic data	
1) Initial speed	
Armour-piercing bullet	285m/ s
Explosive shell	310m/ s
2) Maximum bore pressure	630kg/ cm2
3) Ability (armour-piercing bullet)	180mm(hit at 90°)
4) Maximum. range	6200m
5) Battle sight range	340m
2 Structural parameters	
1) Calibre	75mm
2) Number of rifles	28 (evenly spaced, right hand spiral)
3) Elevation	-5° —30°
4) Firing area	
When muzzle falls in the direction of tripod's front leg	80° to left and to right
When muzzle is opposite to the direction of the front leg	40° to left and to right
5) Sightr base	1354.5mm
6) Height of firing line	
High	720mm
Low	425mm
7) Overall length	2124mm
8) Spacing between front and hind legs (for high firing line)	884mm
9) Spacing between hind legs (for high firing line)	764mm
10) Change of elevation per turn of elevation mechanism handwhell	38′

11) Change of scanning angie per turn of direction mechanism handwheel	2° 44′
3 Weight	
1) Total weight	appr. 50 kg
2) Weight of barrel	appr. 34 kg
3) Weight of gun mount	appr. 16 kg
4) Barrel heat insulation pad and breech heat insulation pad	appr. 0.95 kg
5) Carrying belt	appr. 0.31 kg
4 Operation data	
1) Firing speed	6—8 rounds/ min
2) Flame spraying danger area	60° (within 30 meters)
3) Protrusion of firing pin	2.26--2.82 mm

III. Main parts

The 75mm recoilless gun consists of two parts i.e. barrel assembly and gun mount.(Fih.2 & 3)

Barrel assembly includes: barrel (7), holder-trigger (3), front sight(8), rear sight (4), optical foresight (5),breech block, etc.

Gun mount is composed of: elevation mechanism(6), direction mechanism(2) front leg(11), left leg(10), right leg(9), etc.

These parts are properly joined together to ensure various parts of the gun working co-ordinatively.

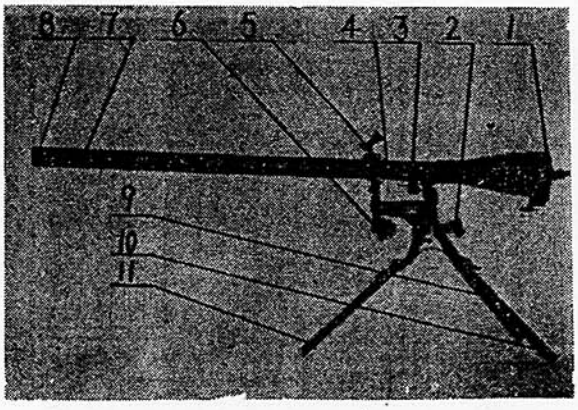
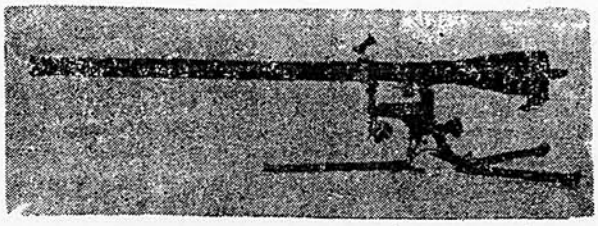


Fig.2 A general view of 75mm recoilless gun
(in high firing line condition)

1. Breech block 2.Direction adjuster 3.Holder - trigger Rearsight 5.Optical foresight 6.Elevation mechanism 7.Barrel8.Front sight 9.Right leg 10.Left leg 11.Front leg



Fig,3 A general view of 75mm recoilless gun
(in low firing line condition)

Chapter 2 Construction

The purpose to learn the gun's construction and to understand the structure of its various parts is to use it correctly and service it properly.

I.The barrel

The function of the barrel is to contain the shell and, after triggering, to give the bullet a forward movement of definite speed and direction through powder gas pressure thus to let it fly at the target.

The barrel unit is composed of barrel assembly, breech block assembly, holder - trigger, sighing device, conical shaft, positioner, etc.

1. Barrel assembly (fig.4)

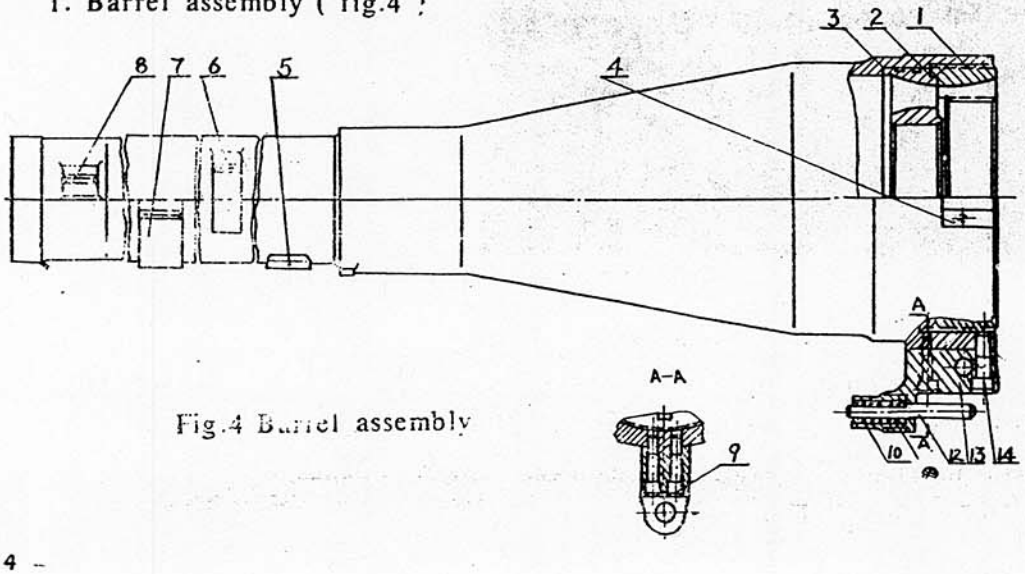


Fig.4 Barrel assembly

1.Barrel sub-assembly 2.Nozzle ring assembly 3.Seal ring 4.(The same as Fig.6) 5.Conical shaft dovetail 6,Holder-trigger dovetail 7.Dovetail of scale 8.Front sight dovetail 9.Breech block seat screw 10.Buffer spring sleeve 11.Buffer spring 12.Buffer rod 13.Breech block seat with buffer 14.Breech block seat set screw

It is composed of barrel sub-assembly (1), nozzle ring assembly(2) and breech block seat with buffer,(13).

1) Barrel sub-assembly

Barrel sub-assembly is formed by breech tube and breech body.

Barrel tube (Fig.5)

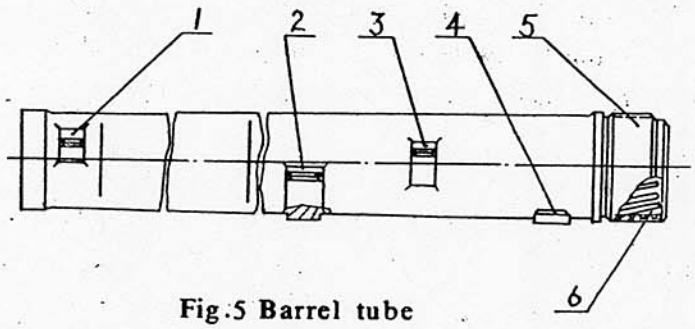


Fig.5 Barrel tube

1.Front sight dovetail 2.Rear sight dovetail 4.Conical shaft dovetail

On the end face of the muzzle there are 4 lines carved crosswise for fitting of graticule durinhg calibration of sighting gear. The rear end of the tube is machined with thread (5) for jointing with the breech. Dovetails are also machined on the tube for mounting of holder & trigger as well as conical shaft. The inside of barrel tube is machined with rifle limes (6).

Breech body(Fig 6)

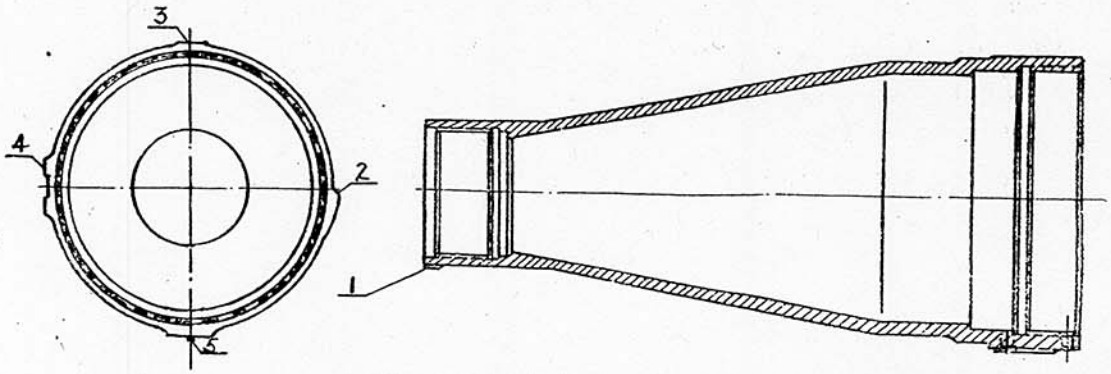


Fig.6 Breech body

1.Positioning notch 2.Boss for block closing safety 3.Inspection pad 4.Boss for positioner 5.Positioning key.

On the upper front of the breech body, a positioning notch(1) is provided for connection with positioner plate of conical shaft, on the upper rear, inspection pad (3) is machined to seat a quadrant for calbration of the gun; on the left rear, boss(4) is provided for fixing of positioner; on the right rear, a boss(2) is made to ensure positive closing of breech block and on the lower rear there is a positioning key(5).

The internal space of the breech body forms the powder chamber, in the front and rear ends of which female threads are provided for connection with barrel tube and breech block seat respectively.

2) Breech block seat, nozzle ring and seal ring (Fig.7)

There are fitted at the rear end of breech body (see Fig.4).

In the nozzle ring (3) are 4 flame holes controling the ejecting powder gas to balance the gun while firing. These nozzle holes will be worn out and enlarged by the high temperature and high velocity powder gas and have to be replaced after a period of time to maintain better balance of the gun at firing. The ring is mounted on the front side of the breech block seat (7) by two screws (8). Seal ring (1) is fitted between breech body and nozzle ring (3) When breech block seat with its male thread is screwed into the breech body, the seal ring will be compressed and deformed to seal the gap between breech body and nozzle ring, preventing powder gas from entering the gap of thread joint between breech body and nozzle ring, A length of slipped thread is machined on the internal surface of the breech block seat to receive the breech block, and in this length of slipped thread, a groove for bullet case drawer is cut. Weight reducing grooves are made in the nozzle ring to diminish the weight of the same.

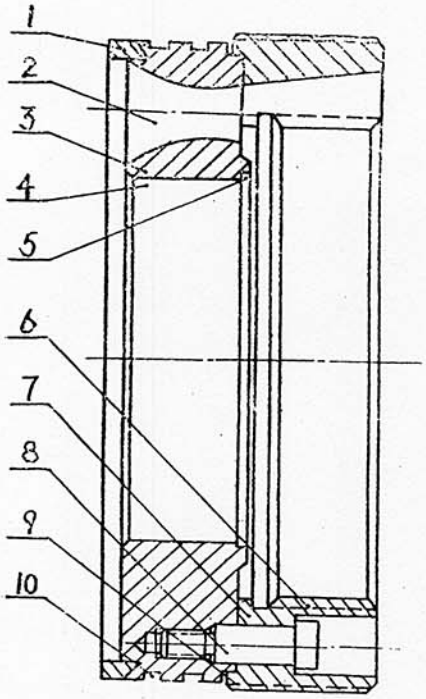


Fig.7 Breech block seat, nozzle ring and seal ring
1.Seal ring 2.Nozzle 3.Nozzle ring
4.Bullet case positioning bore
5.Bullet case retaining spigot
6.Slipped thread
7.Breech block seat8.screw 9.Thread
10.Sealing groove

3)Breech block seat with buffer (see Fig.4)

The breech block seat equipped with buffer has two functions, i.e. to retain the breech block to the breech and to damp the falling momentum of the block when it is opened. The seat is mounted on the lower rear of the breech body by two bolts and a set screw, with a key way on its upper part to match the key on the breech. A horizontal bore in the seat houses the breech block arm pivot by which the breech block is hinged. In the fore part of the seat, a threaded hole is provided for connection with the buffer spring sleeve in which buffer spring and buffer rod are fitted.

2. Breech block assembly

The breeck block is slipped thread type. It is composed by locking device, trigger unit, safety lock and bullet case drawer.

Locking device

1)Locking device (Fig.8)

Locking device is used for opening and closing of breech block. It consists of breeck block body, breech block arm, breech block stopper, pivot, ecentric bush, etc.

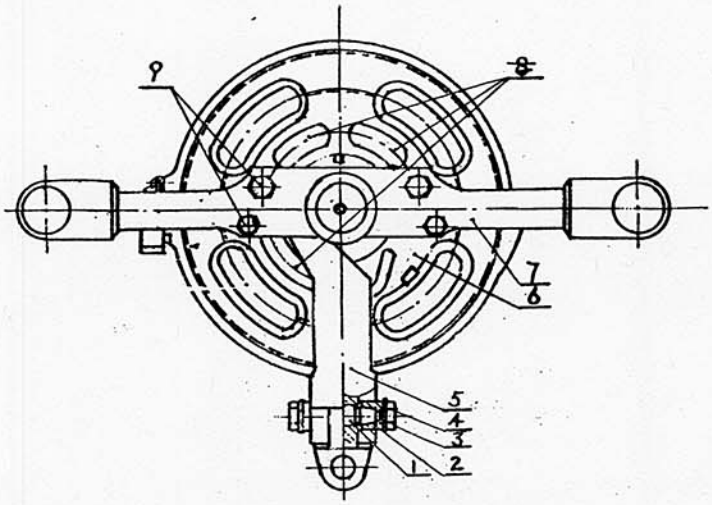


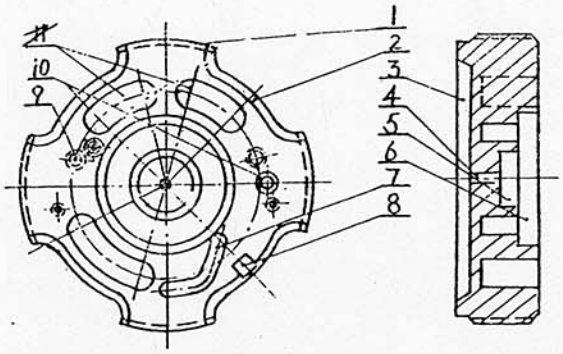
Fig. 8 Locking device

1.Block arm pivot 2.Ecentric bush 3.Washer 4.Nut5.Breech block stopper 6.Breech block body 7.Breech blockarm ~~8.Light weight slot~~ 9.Screw

Breech block body (Fig.9):

It is engaged with the breech block seat through slipped thread to close the breech and press against the bottom of bullet case. The grooves on the slipped thread head together with the block seat and nozzle ring jointly form the nozzle orifices.

In the fore part of the block body, recess (3) is provided to accommodate the bottom of bullet case. In the center of the block body are firing pin hole (4) and firing pin chamber(5), and in the central rear is block body shaft chamber (6) matching the block body shaft on the block arm. An angular slot(7) is situated in the lower rear to guide the bolt pin of the bullet case drawer. when the block is being opened or closed, the bolt pin slides along this slot. A notch is provided by the side of the angular slot (7). When the block is opened to its final position,bullet case drawer clicks inserted into the notch thus to prevent further turning of the block body. 4 screw noles (9) and 2 set pin holes are provided at the rear of the block for fixing of the breech block arm. ~~Light weight slots (11) are for reduction of weight.~~



Fig,9 Breech block body

1.Slipped thead 2.Nozzle (a part) 3.Recess 4.Firing pin hole 5.Firing pin chamber 6.Breech block body shaft chamber 7.Angular slot 8.positioning notch 9.Screw hole 10.Set pin hole ~~11. Light weight slot.~~

Breech block arm(Fig.10):

This is for operation of the breech block. Trigger gear and safety lock are mounted inside. Handles at both ends of it are for closing of the block and for lifting up the gun for short distance move. Trigger gear and stop bar safety tab are mounted on the left and the safety hook is mounted on the right. Cylinder (3) on the central part of it houses the firing pin and firing pin spring. Two opposit spring tightening pins (8) are fitted in the internal wall of the cylinder. The external wall of the cylinder is threaded to connect the firing pin nut. Lock pin mechanism (10) is provided to lock the firing pin nut when the latter is tightened in position. This mechanism consists of lock pin(10), spring (9) and lock nail (11). The truncated circular recess (5) in the central part of the breech block arm is for positioning of the breech block stopper by accommodating it. Breech block arm is connected to the block body through 4 screws.

Breech block stopper (Fig.11):

This connects the breech block to the breech, being the fulcrum of switching of the breech block. On the upper part of it is a flange (1) to match the head of breech block. In the inside wall of the flange two opposite spring tightening pin (2) are fitted to match the spring tightening pins on the breech block arm. When the breech block body is turned to open the breech, the spring tightening pin

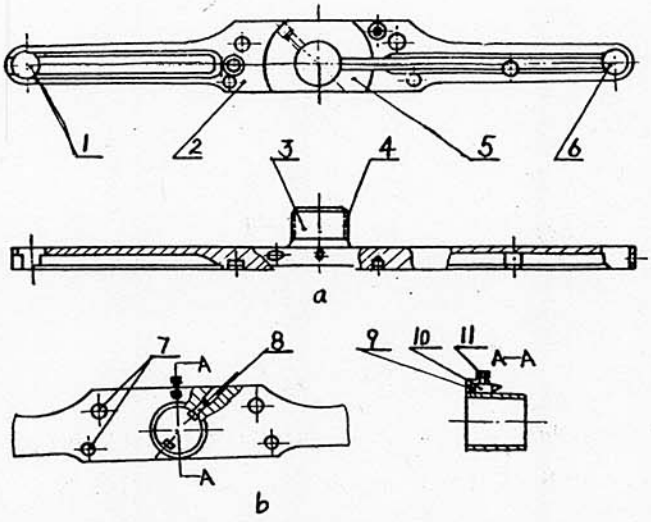


Fig.10 Block arm (a,b)

1.Hole for right handle 2.Breech block arm body 3.Cylinder 4.Thread 5.Truncated circular recess 6.Hole for left handle 7.Screw hole 8.Spring tightening pin 9.spring 10.Lock pin 11.Lock nail

(2) forces the firing pin back into firing-ready position. The 45° slope (3) of the breeck block stopper serves to limit the breech block arm to a certain position when the block is opened. In the middle of the stopper, a groove(4) is provided to receive the bullet case drawer. Connecting lugs (5) are provided in the lower part of the breech block stopper to connect the block seat through a pivot. To reduce weight, light weight slots(6) are provided.

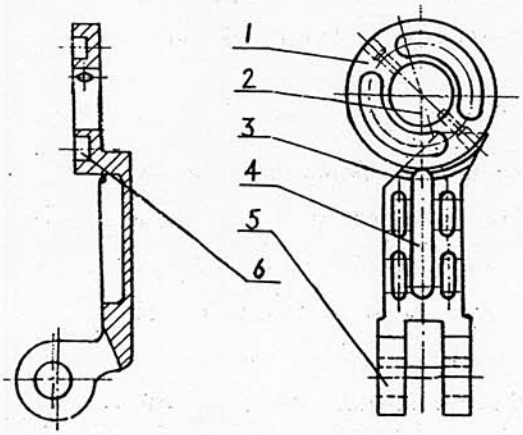


Fig.11 Breech block stopper

1.Flange 2.Spring tightening pin 3.Slope 4.Slot for bullet case drawer 5.Connecting lug 6.Light weight slot

2)Firing gear (Fig.12):

Firing gear consists of trigger gear and firing lock and serves to control firing readiness and to execute firing.

Trigger gear is composed of stop bar (13), stop bar spring (12), stop bar leaf spring (16) and plug (11). Stop bar spring (12) presses stop bar (13) leftward so that its right end inserts into the notch of firing pin (6) thus to set the firing pin into firing-ready position. at triggering, a lever presses down the safety tab (15) of the stop bar to press the safety spring (14), then further trips the spike of stop bar (13) to cause it retreat from the notch of firing pin (6), this firing is carried out. Leaf spring (16) guides the stop bar and covers the groove housing it to prevent dust from entering into th- trigger gear.

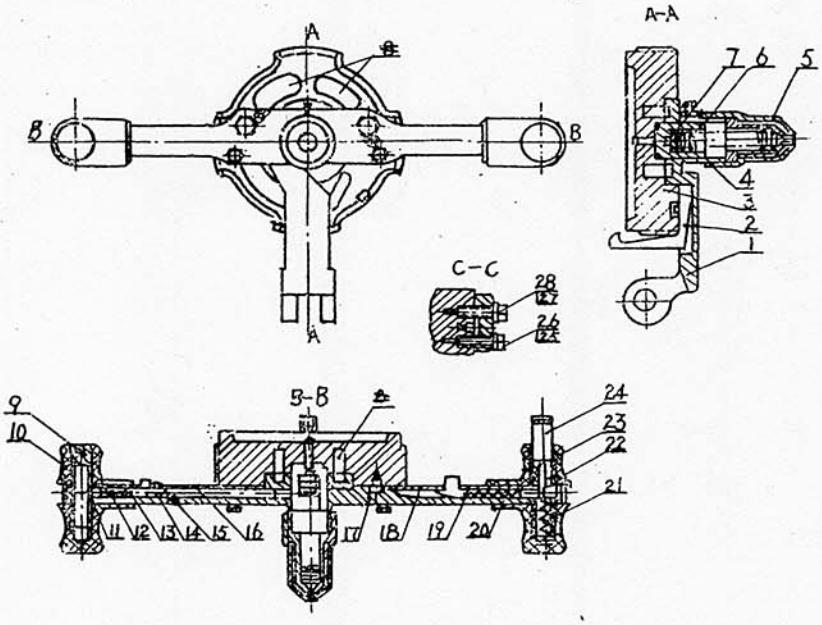


Fig.12 Firing gear and safety gear

1.Block arm stopper 2.Drawer hook 3.Breech block body 4.firing pin nut 5.Firing pin Spring 6.Firng pin 7.Insulation washer ~~8.Light weight slot~~ 9.Left arm 10.Left handdle 11.Plug 12.Stop bar spring 13.Stop bar 14.Stop bar safety spring 15.Safety tab 16.Leaf spring for stop bar 17.Breech block arm body 18.Leaf spring for breech block closing 19.Breech block closing safety hook 20.Breech block closing safety spring 21.Button spring 22.Right handle 23.Right arm 24.Button 25.Washer 26.Bolt 27.Washer 28.Bolt

Trigger gear consists of firing pin (6), firing pin spring (5) and firing pin nut (4). The fore end of firing pin (Fig,13) is called firing pin tip; the aft end is called firing pin body. The bore of firing pin body (2) is called firing pin spring chamber. A heat insulation washer (see Fig.12) is fitted in the chamber's fore end to prevent heat transfer to the firing pin spring. In the external wall of firing pin body(2), a pair of slide channels(4) with spiral fore end are provided to accommodate the spring tightening pins on the breech block stopper and the breech block arm. Besides, for venting of air and collection of oil sludge, two semi-round grooves (3) are made. In firing-ready position, the stop bar inserts into notch(5), the firing pin nut (see Fig.12) closes the rear of the block arm's cylinder part and presses against the firing spring which will give momentum to the firing pin. The small hole in the center of firing pin nut is for calibration of gun by bore sighting. Firing pin nut (4) consists of a bush and a jacket, and asbestos is stuck inbetween to isolte the firing pin from the outside high temperature.

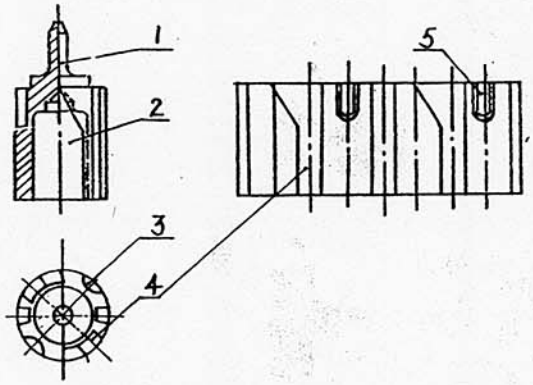


Fig.13 Firing pin

1.Firiing pin tip 2.Firing pin body 3.Groove 4.Slide channel for spring tightening pin 5.Notch in stop bar

3)Safety gear (see Fig.12)

It consists of trigger safety stop bar safety unsucceeded-block closing safety and block closing safety.

Trigger safety lock will be described separately in section " Holder Trigger".

The function of unsucceeded-blok closing safety (Fig.33 and 12) is to

prevent unwanted tripping of trigger by inadvertant touch.It is composed of unsucceeded-block-closing safety (5)and a safety spring.When the breech block is being closed,safety (5)always presses against lever (4)to prevent it from turning.Stop bar latch, through stop bar safety spring and the notch in the stop bar,ensures absolute safety during block closing by preventing uncontrolled retreat of the stop bar thus unwanted firing due to centrifugal force caused by violent action of block closing.

Block closing safety (Fig.12) prevents the closed breech block to open before the former is released. It consists of block closing safety (19), spring (20), leaf spring (18), button (24)and button spring (21). The spike on the closing hook which has a 20° slope, hitches the corresponding spike on the right rear of the breech. At the other end of the safety lock, there is a retangular hole, with an 18° slope,to connect with button (24). When the button (24)and button spring (21) are operated, the block closing safety (19) moves lelf and right: button spring (21)causes button (24)to move upward: block closing safety (19) moves leftward under the action of spring (20) and when the breech block is closed in position, causes the block closing safety (19) to hitch the corresponding spike in the breech thus to ensure breech block closing: when the button is pressed, block closing safety (19) moves rightward to release the safety

4) Bullet case drawer (Fig.14)

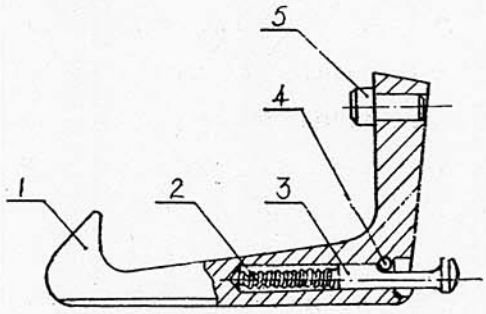
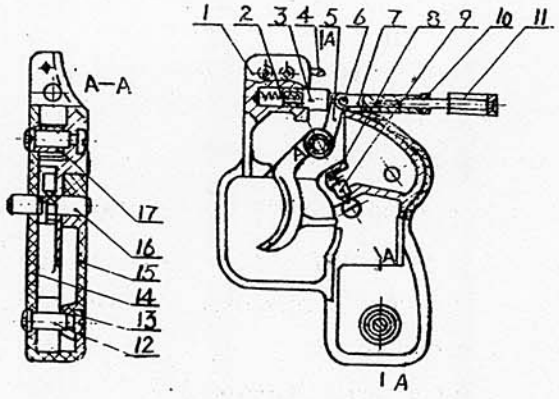


Fig. 14 Bullet case drawer

1. Body 2. Drawer spring 3. Core pin 4. Needle pin 5. Stop pin

The function of bullet case drawer is to pull out the used bullet case to position the breech block when it is fully opened. It is composed of body (1), drawer spring (2), core pin (3),stop pin (5), etc.

3. Holder-trigger (Fig.15)



Fig,15 Holder-trigger

1. Trigger body 2.Pressing stud spring 3.Pressing stud 4.Pin 5.Trigger lever 6.Pivot 7.Pulling rod lock 8.Safety pin spring 9.Safety pin 10.Nut 11.Adjusting screw 13.Round nut 14.Left guard 15.Right guard 16.Safety spindle 17.Bush

The holder-trigger mainly consists of trigger lever (5), pivot (6),drawer rod lock (7), safety spindle (10), trigger body (1),left guard (14), right guard (15), etc. When the trigger lever is squddzed, the lever mechanism is actuated through pulling rod lock and pulling rod, thus triggering is executed. Pressing stud (3), pushed by spring (2), holds the upper end of the trigger to maitain firing-ready position. The length of pulling rod can be altered with adjusting screw (11)to meet the requirement of trigger mechanism motion.After adjusted, the screw can be locked with nuts (16) and (17)(see Fig. 15 and 18)

Safety lock of the trigger consists of safety pin spring (8), safety pin (9), safety spindle (16), etc. Safety spindle can be moved horizontally. Fig.15 shows the firing-ready condition (safety spindle is in left position). If the safety spindle is pressed rightward, the 90° conical tip inserts into another hole in spindle (16)while the notch in spindle (16)moves away from the

position which allows the spike of the trigger lever to move, thus the trigger lever can not ve squeezed and safety is ensured.

4. Sighting gear

This consists of lock pin-rear sight assembly and front sight.

1)Lock pin-rear sight assembly (Fig. 16)

It is formed by the lock pin case, rear sight scale and the seat for optical fore sighe, ect.

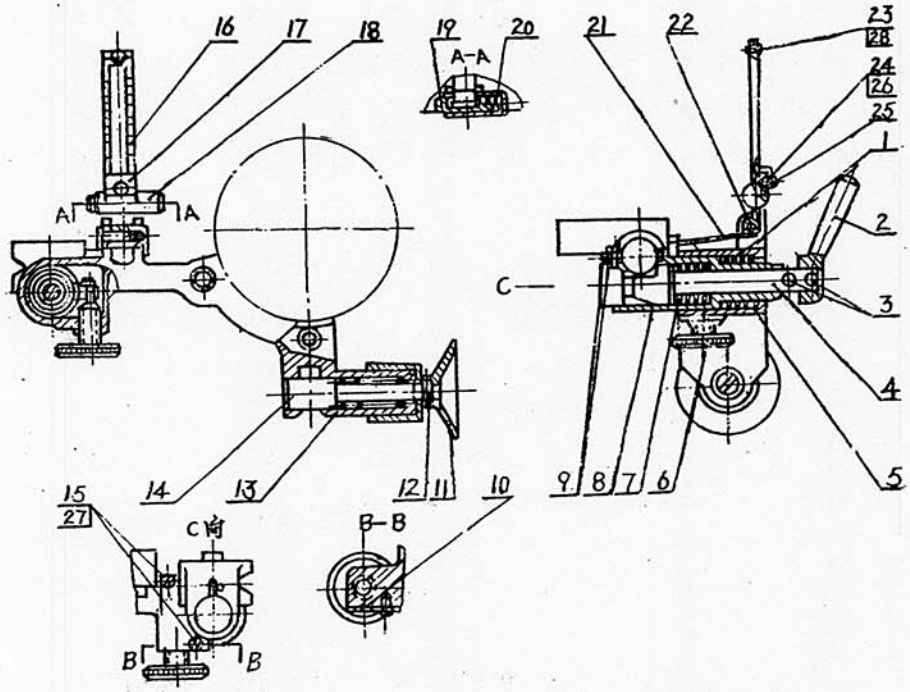


Fig.16 Look pin case and rear sight assembly

1.Lock pin body and rear sight guard weld 2.Lock latch handle 3.Pin 4.Optical foresight lock latch 5.Torsion spring 6.Horizontal-adjusting stud 7.Lock latch spring 8.Socket 9.Cylindrical pin 10.Cover plate 11.Puller head 12.Cylinder pin 13.Pulling rod spring 14.Pulling rod 15. Screw 16. Reat sight scale 17.Sight aperture 18.Sight slide 19.Sight slide lock 20.Sight slide lock spring 21.Leaf spring 22.Rivet 23.Screw 24.Washer 25.Screw 26.Washer 27.Washer 28.Washer

At the lower part of lock pin case (1) is puller head (11). Pulling rod spring (13)is mounted inside the lock pin body, which pulls at the pulling rod (14).Pulling rod is incorporated with puller head (11) by its threaded section and cylindrical pin (12). when puller head (11) is pulled, puller head is engaged with or withdrawn from a round hole in the column of the

elevation mechanism, this junction is the fulcrum of connection between gun barrel and gun mount.

The seat for optical foresight situate at the upper left of the lock pin body. It consists of socket (8), lock latch handle (2), optical foresight lock latch (4), torsion spring (5),horizontal-adjusting screw (6), etc.Lock latch spring (7) always prsesses at latch (4) which fixes the optical foresight. When lock latch handle is turned, optical foresight is locked on or remoed from the optical foresight seat.If horizontal adjusting screw (6)is turned, socket (8) may be turned to adjust the horizontal position of the optical foresight.

Rear sight is also connected to the lock pin body and consists mainly of rear sight scale(16), sight aperture (17), sight slide(18), sight slide lock (19) and sight slide lock spring (20). When sight slide lick(19) is pressed down, sight slide(18) can be moved vertically aling rear sight scale (16). When the desired height of rear sight is set, sight slide lock, if loosened,will push sight sperture (17) to the desired position under the pression of sihgt slide lock spring (20). Sight aperture (17) is fixed to the slide by screw and nuts.Screw(23) prevents sight slide (18) to go off the rear sight. Rear sight scale is connected to lock pin body (1) thruogh rivet (22) which also acts as a pivot for the rear sight scale.

2)Front sight assembly(Fig.17)

It is composed of front sight seat weld (1), leaf spring(3),front sight plate (4), front sight (7), etc.

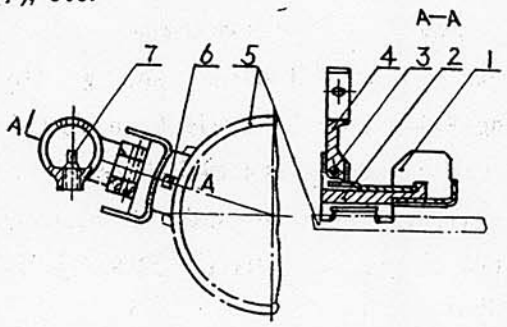


Fig.17 Front sight assembly

1.Front sight weld 2.Leaf spring 3.Rivet 4.Front sight plate 5.Barrel 6.Key 7.Front sight

Front seat weld (1) consists of front sight seat and guard weld. Front sight seat matches with the gun barrel through its dovetail groove and key way as well as the dovetail on the gun barrel. and is fixed by key(6).

Front Sight plate (4) supports front sight (7) and can be raised up or pressed down with rivet (3) as a pivot and leaf spring (2) as positioner. In use, the front sighr plate is raised into vertical position. If not used. it can be pressed down into the guard of front seat weld (1).

Front sight is thread-connected to front sighe plate (4) and can be adjusted to desired height by applying a screw driver at the bottom of it during targeting calibration of the gun.

5. Conical shaft and positioner plate (Fig.18)

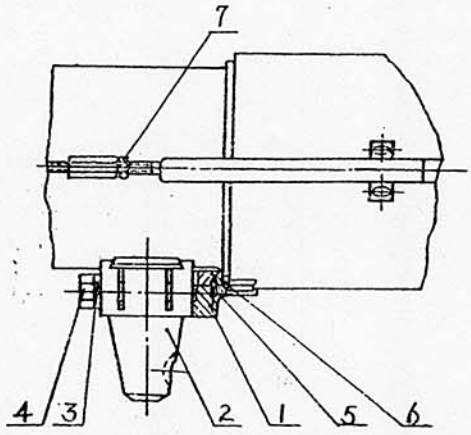


Fig.18 Conical shaft and positioner plate

1.Positioner plate 2. Conical shaft 3. Washer 4.Bolt 5.Cylindrical pin 6.Key 7.Nut

Conical shaft (2) is connected with the gun barrel to the upper and the gun mount to the lower. A dovetail groove at the top of it matches with the dovetail on the barrel; in the middle are two clastic fixing channels through which positioner plate (1) is fixed by bolt (4) while the junction with gun barrel is also tightened at the same time. The conical section of conical shaft (2) mates with the conical shaft seat and is fixed by a tubular shaft catching into the arc-shaped groove in it. This junction is the aft fulcrum

connecting gun barrel and gun mount.

Positioner plate connects with conical shaft (2) by two bolts (4) at its front and mates, at its aft, with conical shaft (2) by two of the breech. Its function os to fix the relative position between conical shaft (2)and gun barrel so that relative rotation is poevented.

Key (6) mates with the key ways in gun barrel, conical shaft(2) and positioner plate (1) to prevent relative rotation between gun barrel, conical shaft and breech.

II. Gun mount

1.Elevation mechanism (Fig.19)

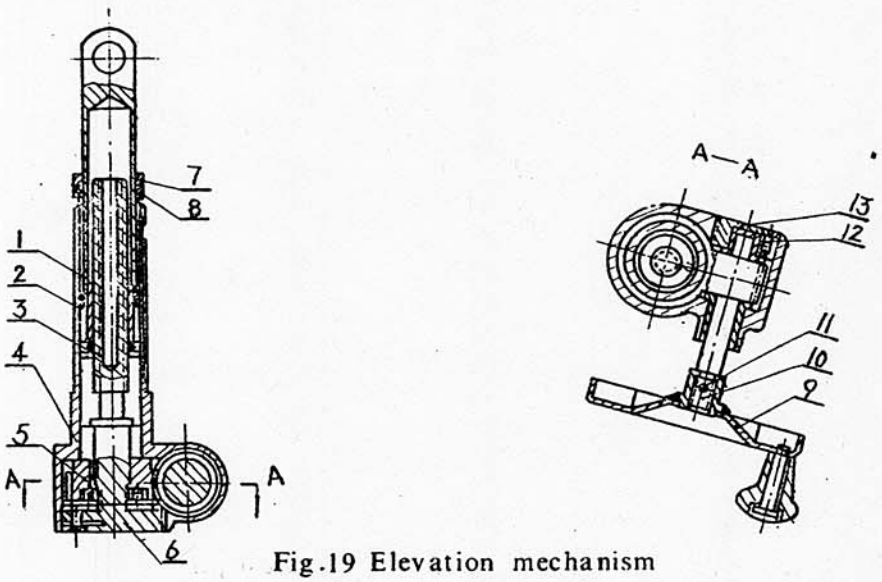


Fig.19 Elevation mechanism

1.Pedestal assembly 2.Casing assembly 3.Screw assembly 4.Flat key 5.Helical gear 6.Screw plug 7.Sealing washer 8.Sealing gland 9.Handwheel assembly 10.Pinion 11.Cylindrical pin 12.Counter-sunk screw 13.Screw plug set

It consists of pedestal assenbly(1), casing assembly (2), screw assembly (3), handwheel assembly(9), pinion assembly (10), etc.

Pedestal assembly (1) is the direct junstion between gun mount and gun barrel. The eye in the top of the column of pedestal assembly (1) matches with the tie rod fitted on the optical foresight seat of the barrel. being the

front fulcrum in connection between gun barrel and gub mount. The threaded bush at the bottom of pedestal assembly mates with screw assembly (3).Bevel gear (5) is mounted on the screw by a plain key (4) which prevents relative rotation between the two, and by a nut which is fixed by an axially mounted screw assembly to prevent looseness.Truly under the screw assembly (3) there are two relatively rotable friction disks wh.ch contact the bevel gear (5) at the top and with the screw plug (6) at the bottom, functioning to improve self-locking of the elevation mechanism.

Casing assembly (2) is the foundation for the elevation mechanism The elliptical bore in the top guides the column and prevents its rotation. Plug set (13) and sctew plug (6) seal the casing assembly and also play the role of positioning. They are all secured axially by countersunk screw (12).

Handwheel assembly (9) is fixed, through thread and cylindrical pin (5), on the shaft of pinion (10) which meshes with bevel gear (5) on the screw asscmbly (3). By turning of handwheel, the pinion drives screw assembly (3)thus to lower or raise the column. On the top of casing assembly (2) is sealing cover (8) in which a sealing washer (7) is fitted inside to prevent water or dust to go in. Sealing cover (8) snaps in the two grooves in the upper part of the casing by its own resilience.

2.Direction mechanism (Fig.20)

It consists mainly of housing assembly (27), eccntric bush, bush assembly (26), stand body (18), handwheel assembly (19), worm gear(3), worm screw (25), roller bearin (10), conical bearing bush (17), bearing ring (16),etc.

Casing assembly (27) is the supporting part for the moving parts of the direction mechanism. With roller bearing (10) mounted at its top, bearing ring (16) and conical bush (17)at its bottom, it supports all moving parts of the direction mechanism through its fit with stand (18), thus rendering itself rotable about the vertical shaft of the stand. Sealing ring (1) at the bottom of casing assembly (27) ensures water and dust proof.In the upper part of the casing assembly (27), at the stand, there are two holes for mounting of conical shaft stand. This junction is the rear fulctum of connection between gun barrel and gun mount.On casing assembly (27), left and right bracing plates are welded. protruding forward. In the front of the bracing plates, there are two holes for mounting of support ring of the elevation mechanism. At the bottem of the casing assembly, a side hole for eccemtric bush assembly (26) is provided.

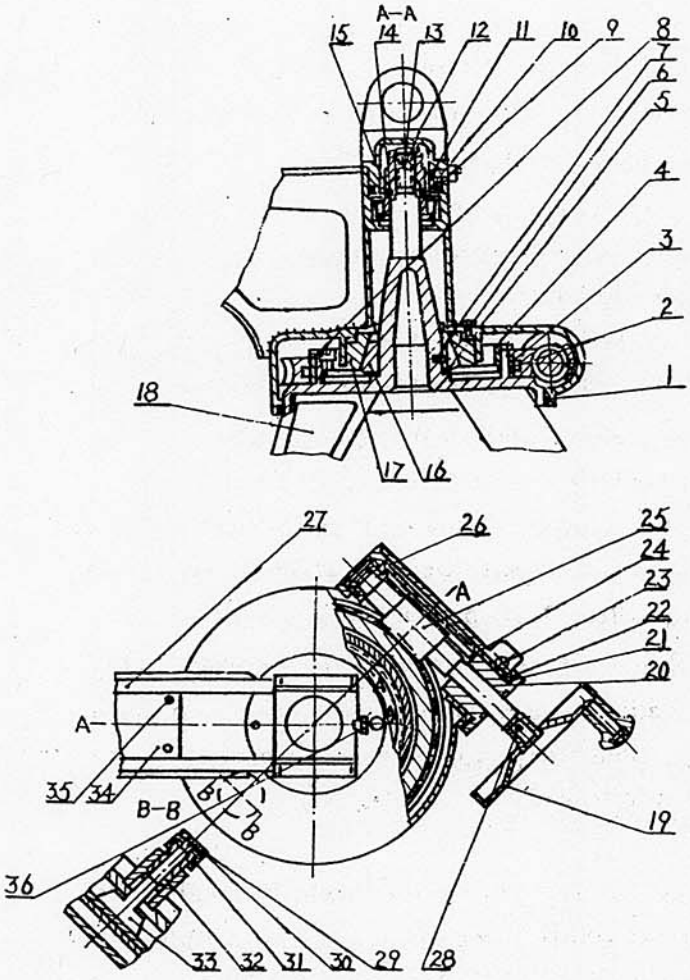


Fig.20 Direction mechanism

1.Sealing ring 2.Expansion ring 3.Worm gear 4.Screw cover 5.Washer 6.Screw 7.Cylindrical pon 8.Set screw 9.Sealing ring 10.Roller bearing 11.Bolt 12.Cotter pin 13.Dust cover 14.Washer 15. Adjusting nut 16. Bearing ring 17. Conical bearing bush 18.Stand 19.Handwheel assembly 20.Shaft sleeve 21.Washer 22.Sealing ring 23.Screw 24.Adjusting washer 25.Worm 26.Eccentric bush assembly 27.Casing assembly 28.Cylindrical pin 29.Cylindrical pin 30.Flat nut 31.Handle 32.Nut 33.Direction lock latch 34.Leather gasket 35.Hollow rivet 36Washer

In the eccentric bush, wor, (25) is mounted, one end of which extends into the copper bush of eccentric bush assembly, the other end is positioned

by shaft sleeve (20). Axial position of worm (25) is adjusted by adjusting washer (24); Sealing ring (22) is used for dust proof; washer (21) is used for looseness prevention.

Screw (23) is used to tightern the eccentric bush and to limit the axial position of eccentric bush assembly (26). Worm (25) meshes with worm gear (3). By turning eccentric bush assembly (26), mesh clearance between worm gear (3) and worm (25) can be adjusted. At its external end, worm (25) connects with handwheel assembly (19) through thread and cylindrical pin (28).

Worm gear (3) is mounted on the stand (18). Screw cover (4) is fitted on the top of worm (14) to prevent looseness, and the latter is secured by set screw (8). An expansion ring (2) is fitted inside worm gear (3). When direction lock latch (33) is tightened or loosened, expansion ring (2) is expanded or recovered thus to connect or disconnect worm gear (3) and stand (18). Flat nut (30) connects with direction lock latch (33) through thread and cylindrical pin (29), and secures handle (31) in position between flat nut (30) and nut (32). When handle (31) is turned, the rotation of left-hand threaded nut in the threaded hole of stand causes the direction lock latch to retract or reset.

Bearing ring (16) is secured in position in a round hole under the vertical shaft of stand (8) by cylindrical pin (7). The external diameter of conical bearing bush (17) is tight -fitted in the lower central bore of casing assemblt (27). The outer race of roller bearing (10) is right-fitted in the upper central bore of casing assembly (27), while the inner race is loose-fitted on the upper diameter of vertical shaft of stand (18). Adjusting nut (15) presses on and positions the bearing, and is locked by cotter pin (12) to prevent its looseness.

A dust cover (3)is fitted, through bolts (11), on the upper part of casing assembly (27). Inside the dust cover, sealing ring (19) is fitted to ensure dust and water'proof. Washer (30) prevens the rotation of bolt (11).

Between the left and right bracing plates of the casing asstmbly (27), two leather caskets (34) are riveted by rivets (35). These are for anti-friction and securing when the elevation mechanism is pushed between left and right bracing plates for positioning.

3.Tripod (see Fig.21)

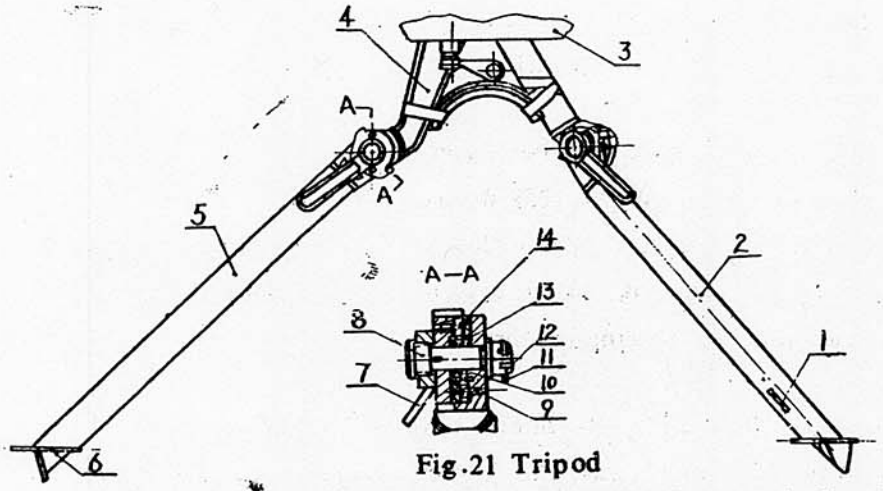


Fig.21 Tripod

1.Ring for sling 2.Left hind leg assembly 3.Tripod body 4.Front upper arm 5.Front leg assembly 6.Anchor 7.Handle 8.Pivot 9.Countersunk screw 10.Spring of toothed plate 11.Cotterpin 12.Grooved nut 13.Set ring 14.Toothed plate

This consists principally of front leg assembly (5), left hind leg assembly (2), right leg assembly (see Fig.2), as well as toothed plate (14), handle (7), etc.

Front leg assembly (5) connects with arm (4) under tripod body (3) through pivot (8), handle (7) and toothed plate (14). Pivot (8) serves to connect and to support, with the crown nut (12) and cotter pin (11) to set its cylindrical section at given length.When handle (7) is turned down and pressed, shaft (8) is withdrawn by the internal thread on handle (7) acting on the thread of the shaft, and at the same time compresses toothed plate spring (10) to joint front leg assembly (5) with front upper arm (4) of tripod body (3). This is the locked condition.On the upper end of the front leg and the lower end of front upper arm, toothed plates (14) which are secured by countersunk screw are mounted, these plates are for looseness prevention. A set ring (13) is fitted at the positioning key of each toothed plate (14) to prevent breakage of countersunk screw (19) by shearing when long tudinal force is applied along the positioning key.

When handle (7) is raised and loosened, the two toothed plates 4)connecting front leg upper end and upper arm (4) are disengaged, thus the front leg can be turned and adjusted according to the desired height of firing line.

On the front leg upper end and upper arm, positioners are provided. When handle (7) is loosened, front leg lowers freely, and the positioner will stop it at high firing line. On the contrary, if the front leg is folded up in position, the positioner will secure it into the condition for holding on man's back during marching. Anchor (6) is welded on the bottom of the front leg, which faciltates setting-up of the gun and improves stability during firing.

The eft hind leg and right hind leg are fthe same in contruction and operating principle as that of front leg. The only difference is that sling rings (1) are welded additionally on the former, two at each end, to attach slings for carrying on back.

4.Elevation mechanism support ring (Fig.22)

The elevation mechanism support ring is mounted on the foremost of the left and right bracing plates of direction mechanism, serving to support the elevation mechanism. It is formed by support ring (7), left shaft (5), right shaft (10), jack screw (2), sole plate (6), etc.

Copper bush (4) is pressed in the front end hole of the left and right bracing plates of direction mechanism casing (11). Support ring (7) between these plates is supported by left shaft (5) and right shaft (10).The central bore of support ring (7) matches with the height adjuster casing. Set pin (8) serves as a guide and a positioner when the elevation mechanism casing moves vertically.

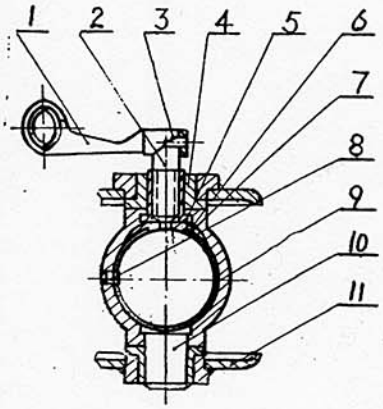


Fig.22 Support ring for elevation mechanism
1.Handle 2.Jack screw 3.Cylindrical pin
4.Copper bush 5.Left shaft 6. Sole plate
7. Support ring 8.Set pin 9.Circlip
10.Right shaft 11.Direction adjuster adjuster casing

Handle (1) connects with jack screw (2) by cylindrical pin (3). The front end of jack screw (2) is loosely connected with sole plate (6). When handle (1) is tightened clockwise, jack screw causes sole plate to shove the elevation mechanism tight. The outer surface of sole plate (6) is cut with small channels of cross direction to mesh with those on the outer surface of the elevation mechaism to prevent slipping.

When handle (1) is turned anticlockwise, the circlip will expandand pushes sole plate back, and the elevation mechanism can them be lifted up or lowered down along support ring (7) as dssired. Because of the slip fit between left and right shafts and the copper bush (4), support ring (7) can be turned slightly forward-backward along with the vertical movement of the elevation mechanism's column.

5.Stand for conical shaft of gun barrel (Fig.23)

Stand for conical shaft of gun barrel is mounted on the top of direction mechanism casing It connects the gun mount and the conical shaft of gun barrel, being the aft fulcrum connecting the two.

This conical shaft stand consists mainly of cone seat (7). spindle (3), screw plug (9), etc.

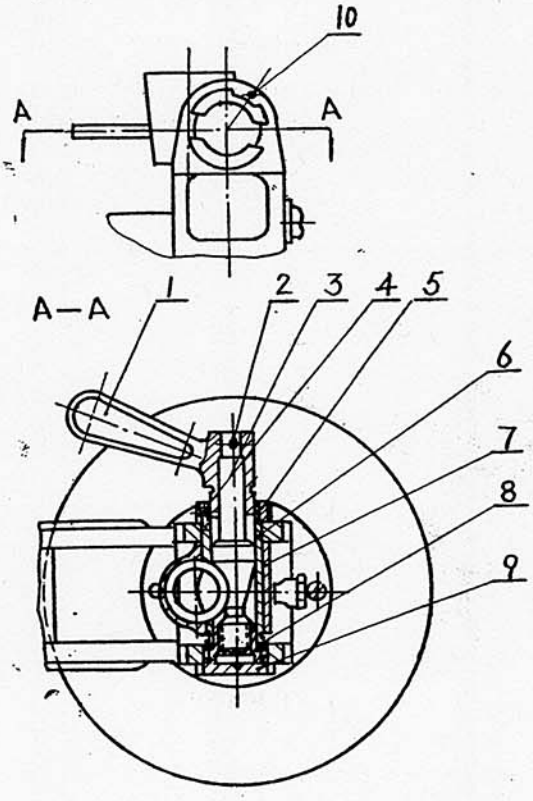


Fig.23 Conical shaft stand

1.Handle 2.Sylindtical pin 3.Spindle 4.Clinerical pin 5.Nut 6.Tubular shaft 7.Cone seat 8.Washer 9.Screw plug 10.Cylindrical pin

Tubular shafe (6) is mounted in the two lug holes on the top of the direction mechanism casing, with nut (5)fitted at its right end to prevent it from falling out and a cylindrical pin (4) to secure nut (5). Cone seat (7) is fitted over tubular shaft (6). Spindle (3) is fitted inside tubular shaft (6).

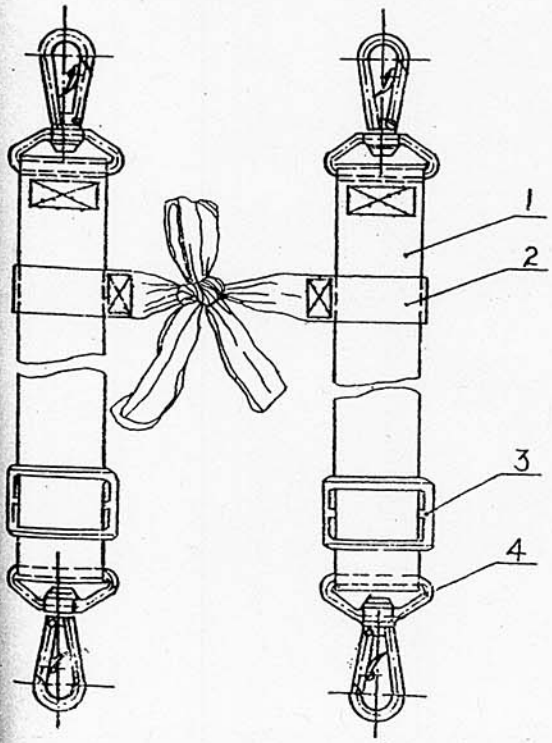
Spindle (3) connects with screw plug (9) through lefthand thread at one end, connects with handle (1) through cylindrical pin at the other end. With washer (8), the position of handle (1) and spindle (3) can be adjusted.

After placing the gun barrel conical shaft into cone seat(7), tighten handle (1) towatds upper rear, conical shaft (3) will be drawn in by the effect of the lefthand thread on conical shaft end and screw plug (9), and will be locked by spindle (3). At the left side of tubular shaft (6), there is an elliptical hole which matches the notch on the left side of cone seat (7) to joint the two parts together for common rotation.

To facilitate connection between gun barrel conical shaft and cone seat (7), cylindrical pin (10) is fitted on the left side to the lug of direction mechanism casing ty limit the range of turning of tubular shaft (6).

III.Other parts

1.Sling (Fig.24)



The sling, which is for carrying the gun on man's back. is formed by left sling and right sling and they are composed of master belts. small belts. buckles, etc.

Fig.24 Sling
1.Master belt
2.Small belt
3.Twin bracket
4.Hanger

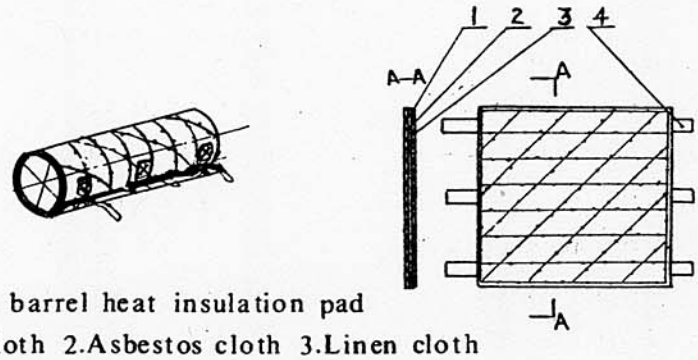


Fig.25 Gun barrel heat insulation pad

1.Linen cloth 2.Asbestos cloth 3.Linen cloth

4.Small belt

In use, buckles (4) at both ends of left and right slings are buckled into the two sling rings on left and right legs of the gun mount respectively. The length of the slings can be adjusted with twin bracket(3).

Small belt (2) can be adjusted regarding its position along the master belt. When the sling is adjusted to desired length and the gun mount is carried on back properly, small belt(2) can be set to the height of one's breast. In this condition, it is not neccessary to hold the gun mount by hand during marching.

2.Barrel heat insulation pad and gun breech heat insulation pad

These are provided to avoid injury by the high temperature when the gun is handled after firing.

The gun barrel heat insulation pad is sewed up with two outer linen cloth (1) and (3), and a layer of asbestos cloth(2) in between. In application, use small belt (4) to tie it around the gun barrel, as shown in Fig.25.

The gun breech heat insulation pad is the same in formation and function as those of the varrel heat insulation pad. For application, just use belts (5) and (6) to tie it around the breech, as shown in Fig.26. The difference is: the notch of the pad should be placed under the breech to catch the stand for conical shaft and run the long belt(6) round the breech for one loop so as to tie up the notch, preventing it from folding out.

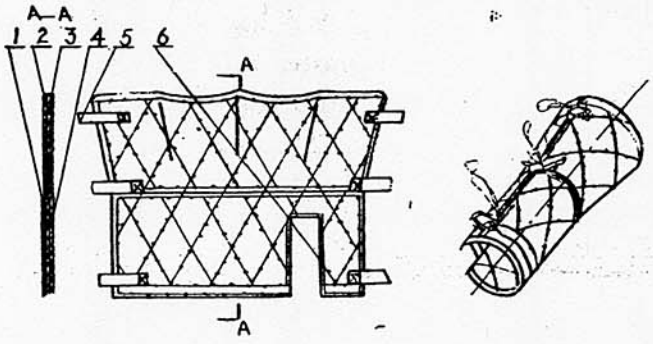


Fig.26 Breech heat insulation pad

1.linen cloth 2.Asbestos cloth 3,4.linen cloth 5.short belt 6.Long belt

3.Canvas shoulder pad (Fig.27)

This is made of foam plastic pad (4)wrapped with linen cloth (2),(3) & (5) and sewed up. It is tied onto the shoulder pad plate of the gun mount.

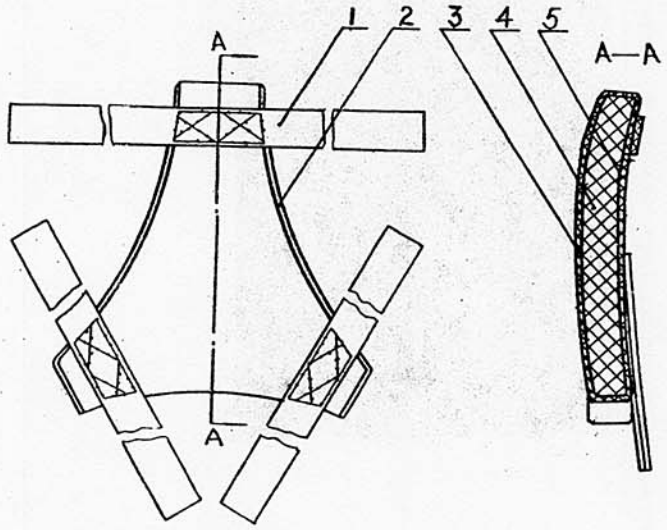


Fig.27 Canvas shouder cushion

1.Belt 2,3.Linen cloth 4.Foam plastic pad 5.Linen cloth

4.Optiacl foresight

The optical foresight can be used for direct and indirect aiming and is comopsed of lens and body(Fig.28)

1) Contruction

(1) Lens: These consist of len barrel and barrel elevation mechanism. Len barrel is a zigzag optical system (Fig.29). It is formed by object len (1),prism (2), graduation len (3), eyepiece (4), etc. Elevation mechanism consists of elevation knob (20), supplementary graduation ring (21) and main elevation graduation ring (14).The main elevation graduation ring is divided into $\pm$300 mils, with 100 mils as a graduation division. The supplementary graduation has 100 graduation divisions, each of which occupies one mil. Graduation

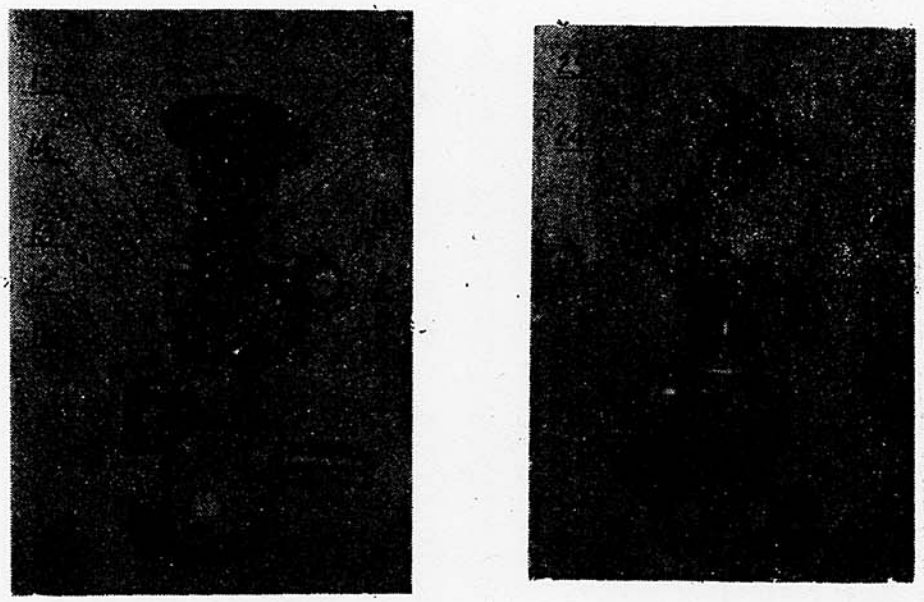


Fig.28 Optical foresight

1.Supplementary elevation pointe 2.Foresight body 3.Inserting spindle 4.Main graduation pointer 5.Elevation disc 6.Direction graduation pointer 7.Direction graduation ring 8.Night illuminator fixing ring 9.Illumination window 10.Rubber protection ring 11.Direction supplementary graduation ring 12.Direction supplementary graduation pointer 13.Inclination tum14.Main elevation graduation ring.15.Main elevation pointer.16.Elevation knob 17.Supplementary elevation pointer.18.Elevation datum 19.Night illuminator fixing ring.20.Elevation knob 21.supplementary elevation graduation ring.22.Spplementary elevation pointer 23.Unlocker.24.Front sight 25.Aperture

on the graduation len is for direct aiming. The tip of the'A' mark at the center of the len is the zero point and the lines under]t,which are marked with 2,4,6,8,....,indicate the distance of direct firing,with each division equivalent to 100 meters This optical foresight can be used for direct aiming within 1500 meters.

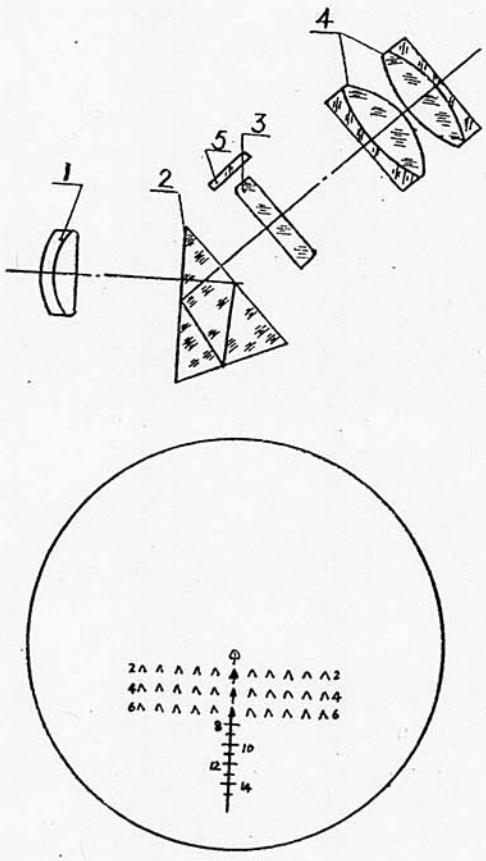


Fig.29 Graduation len
1.Object piece 2.Prism
3.Graduation len
4.Eyepiece
5.Illumination
window glass

The graduation len is calibrated horizontally with three vertical targets and the graduation is for direction dividing for direct aiming with the gun.The space between tips of adjacent targets is divided into 10 mils,in total,100 mils.

(2) Foresight body

this is formed by direction,elevation angle finder,inserting spindle (3) etc.The directionangle angle finder is mounted on the top of the body,and composed of direction graduation ring (7) supplementary direction graduation ring (11) ,direction knob,etc.The direction graduatiom ting has 60 graduaztion divisions,each equals to 100 mils.The auxiliary direction graduation ring (11) has 100 divisions,each equals to 1 mil.Elevation angle mechanism is composed of elevation disc (5) on the right side of the dy,supplementary elevation graduation ring (17) at the bottom of the

dy,elevation knob (16) ,etc.Each division on the elevation disc equals to 100 mils.The total range contains+800 mils (48) and -100 mils (6) The supplemental graduation has 100 divisions,each equals to one mils.

the datum mechanism consists of elevation datum (18) which is graduated by 4′ and inclination datum (13) of air bobble type which is graduated by 30′.

2) Particulars of optical foresight

(1) Optical particulars

Power	2.3*
Vision angle range	16

(2) Constructional particulars

Direction finding range	6000 mils (360°
Elevation	+800 mils (48)
	-100 mils (6)

3) Application

(1) Procedures to use the opt cal foresight

a) In setting up the graduation rings and in aligning the tip of the ′ ′ mark with aiming point,always turn the knobs in the same direction to avoid the effect of backlash.

b) To set the direction angle and elevation angle,use the direction graduation ring for large angle and the supplimenta direction graduation ring for small angle.If direction is to be changed by large angle,unlocker (23) should be used.The unlocker should be fully pressed down,then turn the len to the desired position and release the unlocker carefully to avoid damage of components.

(2) Installation

Insert shaft (3) of the foresight into the foresight retainer on the gun and put the cylindrical pin of the inserting shaft (3) into the slot of the retainer,then push latch handle (2) to the fixing position (see Fig.16)

(3) Direct aiming

a) Reset various parts of the optical foresight to zero.

b) Turn the elevation mechanism and direction mechanism,select the corresponding range and lead to set the target in the graduation len,then execute firing at the target.

(4) Indirect aiming

a) Set dircetion angle,elevation angle and aiming angle (rear sight scale) on the sighting gear according to the commander's order.

b) Turn the elevation mechanism to have the datum air blbble in the middle.

c) Turn the direction mechanism to have the tip of "A" mark coincided with the aiming point,then fire.

5.Illuminating devices

Night illumination device is used on the optical foresight for performing firing at night (Fig.30) .Its function is to illuminate the graduation scales of the optical foresight.

Power box is fitted with two"NO.1" battery cells inside.The clip on the rear of the power box catches onto the retainer plate on the gun mount(Fig.32) The lamp socket (1) for illumination window is fitted at illumination window (9) (Fig.28)

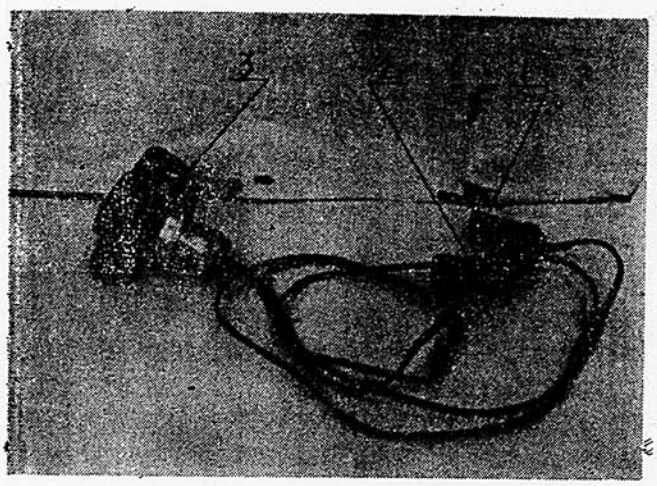
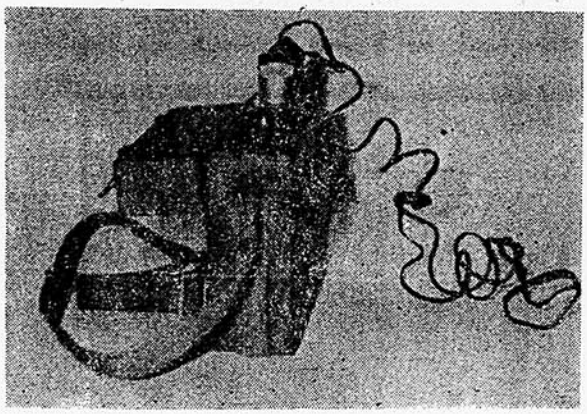
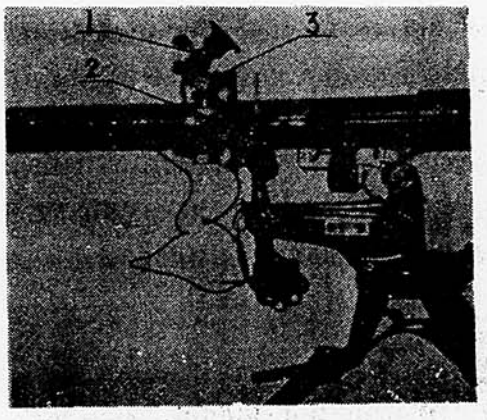


Fig.30 Night illumination device
1.Illumination window lamp socket
2.lamp socket
3.Power box

,serving to illuminate the graduation inside the foresight.Lamp socket (2) connects with light condenser tube which is an accessory of the foresight and are mounted respectively on fixing rings (8) or (9) of the same.These lamps illuminate direction graduation and elevation graduation.

Note:The electrical power can also be supplied by alkaline batteries as Fig 31





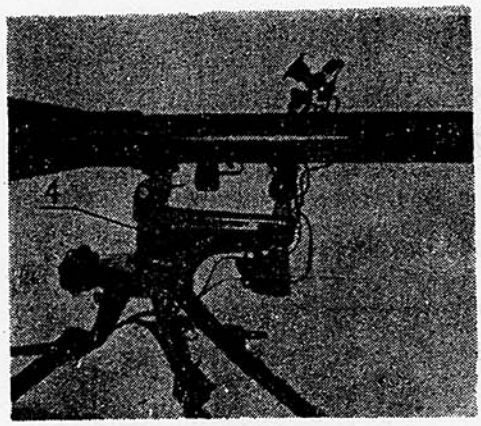
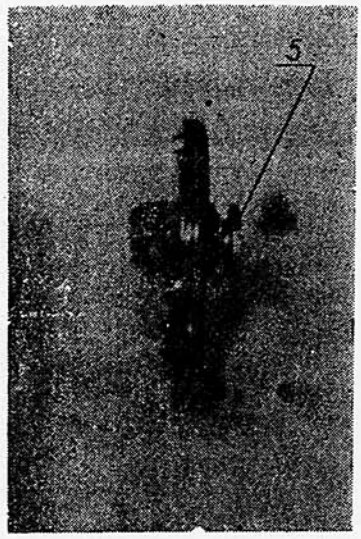


Fig.32 Mounting of night illumination device on gun mount

1.Fitting position for window lamp socket2.Fitting position for window lamp socket 3.Fitting position for window lamp socket 4.Position for power box (4)

6.Quadrant

Each of this gun is complete with a quadraqnt for checking the sighting gears and setting the firing angle.



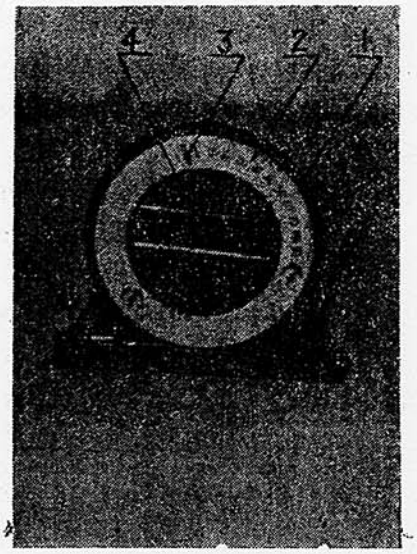


Fig.33 Quadrant

1.Body 2.Graduation disc 3.Adjusting screw 4.Leveling instrument 5.Fixing screw 6.Base

1) Construction (Fig.33) :

It is composed of body 1) graduation disc (2) ,leveling instrument (4) ,fixing screw (5) ,ect. On the graduation scale (2) ,there are 500 mile in the "-" direction and 100 mils in "+" direction.In the true upward direction,there is a graduation line which is the graduation index line.After loosening the fixing screw (5) ,graduation disc (2) may be turned in 360°

2) Operation procedures for the quadrant

(a) Inclination of the conical shaft of gun barrel shall not exceed 5° .

(b) Carefully clean off grease sludge and dust from the inspection pad and the base (6) of the quadrant.

(C) Place the quadrant base (6) tightly on the surface of the inspection pad .To check horizontal levelness of the gun,align the "O" graduation of the quadrant graduation disc with the positive (+) index line.

3) To set firing angle for the gun,using quadrant

(a) Place the quadrant base (6) on the inspection pad of the gun breech.

(b) Loosen fixing screw (5) ,turn graduation disc (2) to align the desired angle with the graduation index line.

(c) Turn the elevation mechanism of the gun to have the air bobble of the quadrant in the middle position.Now the desired firing angle for the gun is set.

4) To measure firing angle of the gun,using the quadrant:

(a) Place quadrant base (b) on the inspection pad of the gun breech.

(b) Turn graduation dise (2) to have the air bobble in the middle position.Now the firing angle of the gun can be read from the graduation dise of the quardrant.

5) Checking of zero position and rectification:

(a) Place the gun on a level ground surface.

(b) Reset the quadrant to zero

(c) Place the quadrant on the inspection pad of the gun breech.

(d) Turn the elevation mechanism to have the air bobble in the middle position then turn the quadrant up side down by 180° .

In this condition the air bubble of the level—meter should still be at the middle position or not deviate by half of a division otherwise the leveling instrument is considered inaccurate,and rectification should be made by turning the elevation mechanism to eliminate half of the error of the air bubble and by adjusting the adjusting screw to cancel the another half.Repeat this rectification until the error of air bubble does not exceed the above range when the quadrant is turned inversely by 180° .

Note:The gun can also be supplied with frame type quadrant as Fig.34

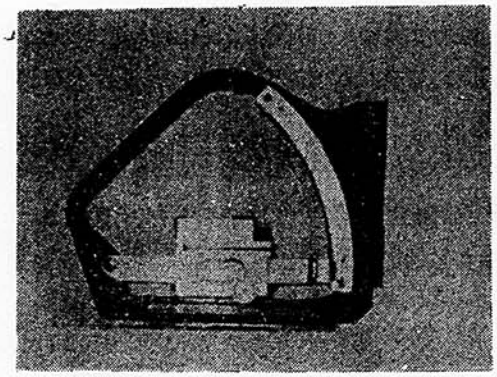


Fig.34.Frame quadrant

Chapter 3 Operation

Correct and skilledful use of the gun and proper maintenance means the full play of the gun's ability to kill and wound enemy.

I.The gun barrel

1.Breech block (Fig.35)

1) Ordinary position

Locking device (see Fig.8) :

Breech block body mates with the block seat,with the breech block arm in horizontal position and the breech block stopper in vertical position.The spring tighening pin on the block arm and that on the block stopper locate in the same channel in the firing pin,being parsllel and immediately adjacent to each other.

Firing gear (Fig.12)

The firing pin is in the front of the firing pin chamber with its tip projecting out of the firing pin bore of the breech block body Firing pin spring is in extending comdition (with a slight compresion) .The stop bar is in left position with its right end pressing against the firing pin body because of the stop bar spring.stop bar safety tab is in released position and the stop bar safety spring is compressed.

Satety gear (see Fig.12) :

Unsucceeded—block—closing safety retracts into its positioner because of downward motion of the block arm thus the safety spring is compressed to release the safety condition ot the lever The stop bar safety is thus in released condition.The leaf spring for breech block closing is in tensioned condition and the button is in the outwardmost position due to the action of the button spring.Thus the breech block safety hook is in the left to catch the corres-ponding spike on the breech and the safety gear is in safety position Bullet case drawer:

It is now in the grooves for it in the block seat and nozzle ring in such a way:with the bolt pin as a center.its front end falls downward and its rear end goes backward:the bolt pin is at the left ent of the "V" slot in the breech body;the drawer spring is compressed.

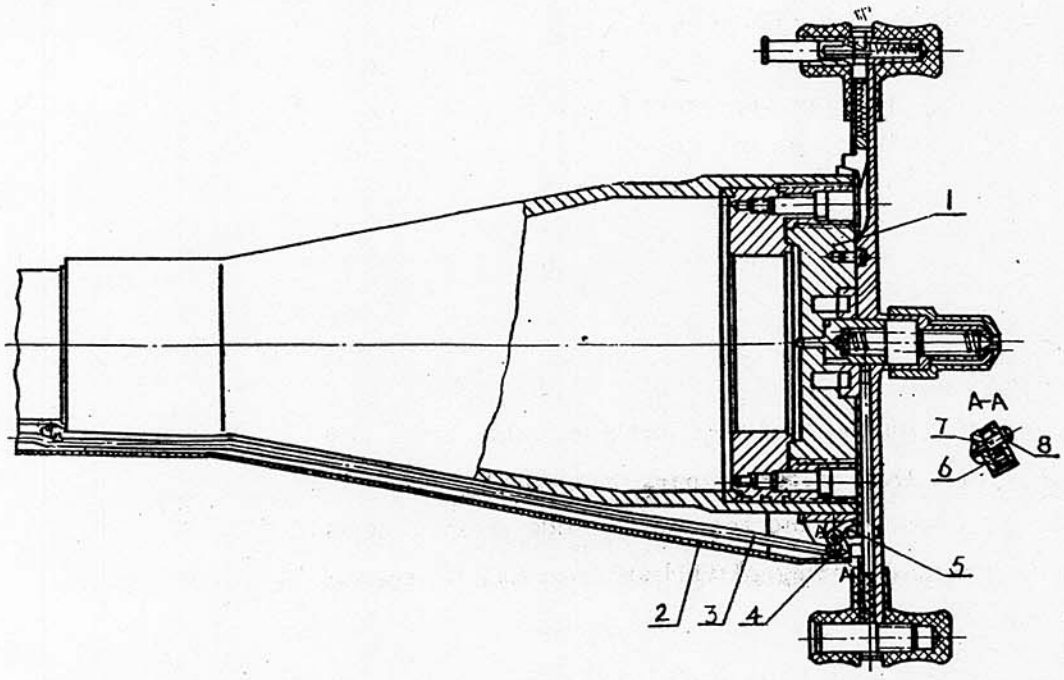


Fig.35 Positions of various parts of breech block in ordinary position

1.Breech block body and trigger gear assembly

2.Pulling rod guard 3.Pulling rod 4.Lever 5.Unsucceeded—block—closing safety 6.Spindle 7.Screw 8.Washer

2) Actions in block opening (Fig .36)

45° position for opening the block

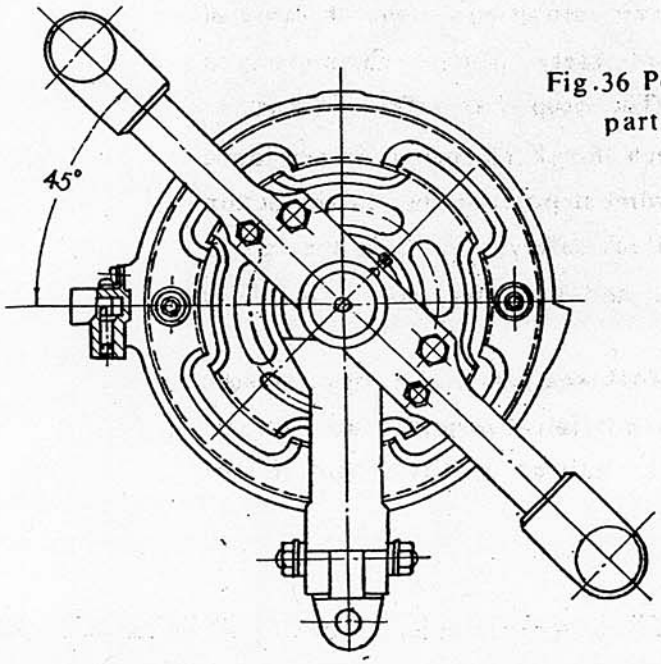


Fig.36 Positions of various parts in block opening

Use the thumb of right hand to press down the buttom (button spring is being comperssed) thus to move the breech block safety hook to the right.The spike on the safety hook then disengages with the spike on the breech.Turn the breech block clockwise for 45° and now it can be opened backwards.When the button is released,the leaf spring for block closing expands and the block closing safety hook moves back to the left.

When the block arm is turned,the spring tightening pin slides in the channel of the firing pin body and forces the firing pin to rotate together.Since the spring tightening pin on the block stopper in front of the block arm will not rotate but catches into the spiral slot of the firing pin body,the firing pin will be fovced backward and the firing spring pin will be compessed.With the backward movement of the firing pin,when the notch on the firing pin body aligns with the right end of the stop bar,the stop bar will move rightwards because of the tension of the stop bar spring and inserts into the notch of the firing pin body.

As the right end of stop bar inserts into the foring body,the notch in the middle of the stop bar aligns with the stop bar safety hook and the expansion of stop bar spring forces the safety hook to catch into the notch of the stop bar thus safety is ensured.

As the block body is turned,the stop pin of the bullet case drawer moves along the "V" shape slot in the block body towards the center of the latter.When the block body is turned in position and falls backwards,the hook of it moves towards the center of the block body and the drawer enters the positioning slant notch.Drawer spring expands and the breech block body can not be turned.

As the block body falls,the lower end of the block stopper hits the damper rod and damping is effected due to the damping spring.

3) Actions of various parts during block closing after gun loading

When the block body is set in position by a lift and push with right hand holding the left handle,because of the effect of the inclined channel in the nozzle ring,the hook of the bullet case drawer is pressed down (drawer spring is compressed) and the drawer leaves the positioning inclined notch of the block body.Only now can the block body be turned to cause the slope on the spike of the breech block safety hook to contact with the slope on the gun breechthus to move the safety hook rightwards and to compress the leaf spring.

When the block body is turned anti—clockwise,because of the breech

block closing safety spring,the breech block safety hook moves leftwards in position and its spike engages with the corresponding ding spike on the gun breech,thus safety is effected.At the same the bolt pin slides to the left end of "V" shape slot in the block body.When the block arm comes into contact with the poaitioner,the unsucceeded—block—closing safety is pressed into the positioner (thus the safety spring is compressed) ,and the safety will leave the safety position of the lever,thus safety condition is released.

When the block is closed,the spring tightening pins on the block arm and the block stopper are again in the same angular position.

4) Actions during firing (see Fig.15 and 35)

When the trigger lever is squeezed to rotate about the pivot,the lever is turned about the screw as a shaft through the prlling rod and shaft.So the lever first pushes back the stop bar safety

hook (stop bar safety spring is compressed) to release it from safety condition and then pushes the spike on the stop bar to move the stop bar to the left thus its right end retreats from the notch on the firing pin body.Therefore,the firing pin is driven forward by the tension of the spring to hit the primer.

5) Actions of block opening after firing

The same as (2) except that when the block body is turned clockwise in position and falls backwards,the hook of the bullet csae drawer catches the bottom flange of the bullet case and pullet it out.

2.The poeration of holder—trigger (see Fig.15)

During the process to squeeze the trigger to fire,the upper end of the trigger lever presses on the pressing stud to compress the pressing stud spring,.When the trigger is released,it is forced back to the original position by the compression of the spring.

In usual time,the safety spindle locates to the right,with the 90° conical tip of the safety pin catches in the hole in the left end of the safety spindle because of the precompression of the safety pin spring,thus the safety spindle blocks the spike of the trigger. lever and safety condition is ensured.

3.The use of mechanical sighting gear (see Fig.2,16,and17)

The sighting scale and the sighting blade are folding type.At ordinary times,sighting scale and sighting plate are in folded in position.In service,the sighting scale and the sighting blade should be raised in upright position.At this time,the slide on the sighting scale fixes the aperture in required position due to the sight slide lock and its spring.

II.The gun mount

1.Elevation mechanism (see Fig.2)

Turning the handwheel of elevation mechanism (6) anti clockwise increases the gun's firing angle and vice versa.This is for fine adjustment of the elevation mechanism.

When the handle (1) (Fig.22) is turned anti—clockwise to its extreme position,the elevation mechanism (6) can then be pulled up or pressed down freely to perform quick and large step apjustment.

This is the quick action of elevation mechanism.

Elevation mechanism (6) can be fixed as required in any position within its quick vertical adjustment range by use of handle (1) (Fig.22)

In addition,when handle (1) on the support ring of elevation mechanism (Fig.22) is put in released position after the gun barrel and the gun mount are separated from each other,the mechanism and the support ring can be turned fore upwards from their natural position to horizontal position.In this condition,the mechanism can be pushed to catch onto the two leather gaskets between the left and right bracing plates.Now if the handle is tightened and the column of the mechanism is cranked up suitably to squeezed position,the gun mount is then in the condition for marching (see Fig.37 and 38)

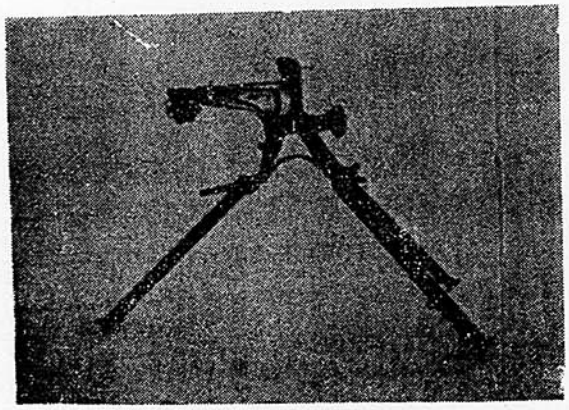


Fig.37 The pattern Of gun mount for holding on man's shoulder for marching

2.Direction mechanism (see Fig.2)

When handle (31) (Fig.20) is locked in aft position,the clockwise turning of handwheel of the direction mechanism makes the muzzle to deflect leftward and the contrary makes it to turn rightward.This is the fine adjustment for the mechanism.

When handle (31) (Fig.20) is turned horizontally leftward to the fore i.e. released position,the direction mechanism (2) is unlocked,The gun barrel (7) can be pushed to turn in 360° .range relative to the gun mount.This is the quick adjustment of the direction mechanism.

On the lower rim of the left and right sides of the direction mechanism casing,two red lines each are marked and the area between the two red lines is the prohibited area of the direction mechanism during firing.During operation for firing,it should be avoided that the red line on the front leg is turned into the prohibited area of the casing so as to avoid overturn of the gun.

3.Tripod legs (see Fig.2)

When the handles for front,left and right legs are turned upward i.e. released (be careful to hold on the barrel to prevent injure to men and damage of the weapon) ,by lifting the gun mount,the legs will fall freely to the high firing line position and then positioned by the positioners.press down the handles tightly,the legs will be locked in high firing line condition.

If the handles are turned upward i.e. released,the legs can then be turned upward to low firing line condition.

Fig.38 The gun mount is shouldered for marching

The legs can be turned and adjusted at will in height between high and low firing lines after the handles are loosened to set them in any required position.

With the gun mount in the pattern for marching as shown in g.37,loosen the handles,turn the direction mechanism (2) by about 90° and tighten handle (31) (Fig.20) ,then turn the legs towards the upper positioners,tighten the handles,the gun mount will be in the pattern for carrying on man's back for marching.When the gun mount is to be carried with sling,the folded gun mount has to be turned over by 180° (see Figs 39,40)

Fig.39 The pattern of folding for carrying on man's back

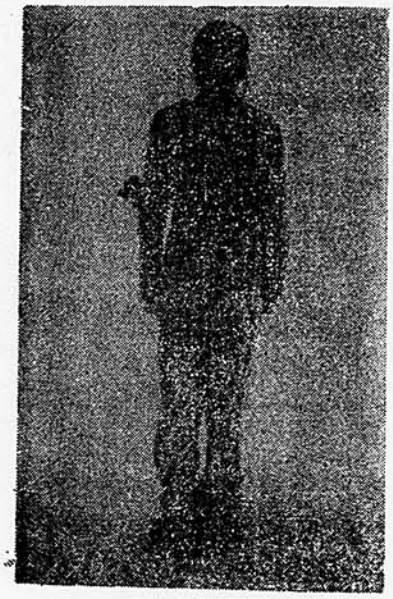


Fig.40 The gun mount is carried on back with sling

For makeshift firing,the gun mount may be removed and advantage can be taken of a tree,wood logs or other material (for example use bamboo or wooden bars to make a makeshift tripod) to support the fore end of the barrel and it is also possible to hold the fore part of the barrel on man's shoulder as a front fulcrum,as shown in Fig.41.

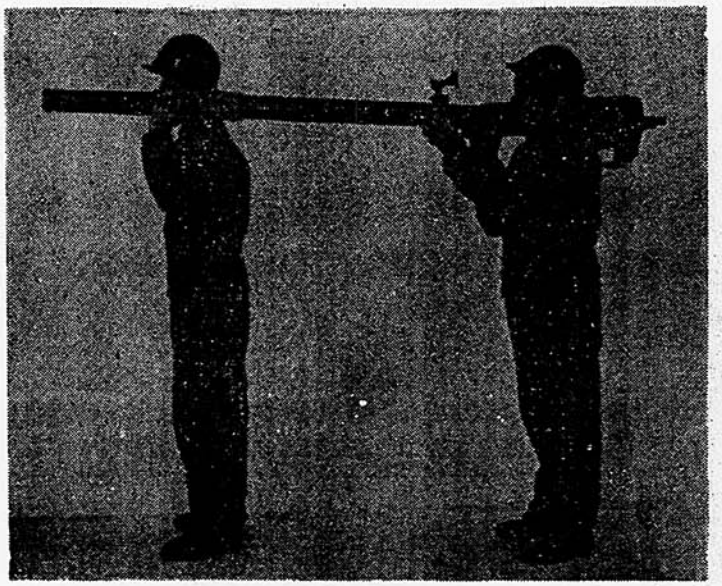


Fig.41 With man's shoulder as the fore fulcrum for a makeshift firing

Cautions:

During use,if it is found that the handwheel of the elevation mechanism fails to self—lock,loosen the countersunk screw under it to adjust the screw plug for remedy.

Chaper 4 Disassembly and saaembly

The purpose to disassemble and assemble is to shift position or to perform maintenance.

I.Disassembly and assembly between gun barrel and gun mount (see Fig 2)

Hold the gun breech with hand,pull the handle at the right side ot the gun to full outward position and turn it clockwise so that it is fixed in outward most position,then the barrel is disjointed with the fore fulcrum on the gun mount.

After that,turn the handle clockwise and upward to the fore position,the barrel will be disjointed from the aft fulsrum on the gun mount.

Now give the barrel an upward lift and it will be dismounted from the gun mount.

The procedure of assembly is just the reverse of the above.

II.Gun barrel

1.Disassembly and assembly of breech block (see Fig .12)

1) Remove the breech block from the breech:

Unscrew the three screws on the block seat using double purpose wrench (1) .Open the block and take it down (together with the block seat) . (The block seat and block stopper are usually not permitted to be separated.)

2) The dismounting of firing gear from breech block:

It is preferably to set the firing pin in firing—reaqdy condition.Then press down the set pin of the nut,remove the nut,then remove the firing pin spring and the firing pin (to remove the firing pin,t is meccessary to push the stop bar leftward by its spike to withdraw it in order that the firing pin is not blocked and difficult to be taken out) .

3) Unscrew the four block arm screws by use of a combined wrench and then separate the block body,block arm,block stopper and bullet case drawer from each other.

4) To dismount the block closing safety hook:

Push the block closing safety hook rightward.Take out the button and button spring.Remove the leaf spring for breech blook closing,breech block safety hook and breech block closing safety spring (in general,the right arm is not pulled out and the right arm is not removed from the block arm) .

5) To dismount the trigger gear from the block arm

Use the double—purpose wrench (1) to unscrew the left arm. remove the lefr handle. Now the leaf spring, the stop bar, stop bar apring, stop bar, safety tab and the stop bar safety spring can all be removed from the stop bar's groove.

Procedures for mounting the trigger gear are the reversal of the above.

2.Disassembly and assembly of the holder—trigger(see Fig. 15,18,35)

Use double— purpose wrench (1) to remove the screw which serves as fixing fulcrum for the casing and the screw which serves as the pivot if the lever. Take out the washer and draw out the guard of the pulling rod. Use the double—purpose wrench(1) to unscrew the two screws on the holder—trigger. Now the holder—trigger can be removed together with the pulling rod. Loosen the two nuts, then the pulling rod together with the lever and spindle can now be removed from the adjusting screw which can also be unscrewed from the pulling rod lock (in general dismantling is not permitted).

Loosen the round nut and the screw, open the left guard, then the trigger lever, the safety spindle, the safety pin, the safety pin spring and the pressing stud can all be taken out of the trigger body and the trigger body can also be separated from the rignt guard (in general dismantling is not permitted).

To remount, follow the above procedures in reverse order.

3. The disassembly and assembly of lock pin case and rear sight assembly (see Fig.16)

The rear sight assembly: Use double—purpode wrench (2) to remove the screw on the top of the rear sight scale. Pinch on the sight slide lock with hand and the sight slide can be slid upward out of the scale. Then the slide lock and the slide lock spring can be taken out from the sight slide. Loosen the screw on the aperture, remove the washer, the aperture can be removed. Drive out the rivet (in general this should not be done),the rear sihgt scale can be removed and the leaf spring can also be pulled out of the groove.

To remount, follow the procedures above in reverse order.

The optical foresight seat: After driving out the two cylindrical pin from the rear end of the optical foresight lock latch, (in general this should not be done),dismount lock latch handle, optical foresight lock latch, and lock latch spring. Afther loosen screw (15), the cover plate, the socket, the torsion spring and horizontal—adjusting spring can all be remved.

The procedures for remounting is the reverse of the above but be sure that both ends of the torsion spring are inserted in the positioning holes of the lock pin body.

4.Front sight assembly (see Fig.17)

The front sight can be screwed out from the bottom using double—purpose wrench. After driving out the rivet (in general this should not be done), the frout sight plate can be dismount and the leaf spring drawn out.

To remount, perform in reverse order.

III.The gun mount

1. Elevation mechanism (see Fig:19)

After loosen the countersunk screw by use of double—purpose wrench, the screw plug (6) and screw plug assembly (13) can be unscrewed using the two cylindrical tags on the combined wrench in the tool set. Drive out cylindrical pin (13) (Usaully it should not be dismounted) unscrew handwheel(9), pinion (10) can then be drawn out. Screw assembly (3) and pedestal assembly (1) can be drawn out directly from the bottom. To separate these two parts,just rotate them oppsitely to each other. To remount, just procede the above in reverse order. In normal, pedestal assembly (1) and screw assembly (3) are not to be disassembled. If it is necessary to dismantle screw assembly. the jack screw has to be loosened first, then use combined wrench to loosen the nut and the bevel gear(5) as well as plain key (4) can all be taken out.

The sealing gland (8) is retained in the casing of elevation mechanism and can be dismounted directly with the sealing washer (7) failing at the same time. To remount, just press them in.

2. Elevation mechanism (Fig.20)

Unscrew screw (23) and the ecentric bush assembly (26) can be removed. After driving out cylindrical pin (28), screwing out handwheel (19), pressing washer (21)flat, shaft sleeve (20) can be screwed out, adjusting washer (24)as well as screw (25) be takened out.

After pressing washer (36) flat and removing bolt (11), dust cover(13) is free to be taken out. Straighten cotter pin (12), use combined wrench in the tool set loosened adjusting nut(15), then takened out washer(14) and the inner race of roller bearing (10). Now the whole csaing assembly (27) and conical bearing bush (17) can be lifted out and also the bearing bush (16) as well as washer (5) are free to be taked out. After unscrew set screw (8) using double—purpose wrench (1), screw cover (4) can be loosened from stand (18), worm wheel (3) can be dismounted.

The outer race of roller bearing (10) and conical bush (17) tightly fitted in their casing, normally they should not be dismounted. If they are to be dismouted, first drive out conical bearing bush (17), making use of the small hole in the top of the casing, then drive out the outer race of bearing (10)

taking advantage of the two small holes in the internal middle flange of the casing.

After driving out cylindrical pin (29), flat nut (30) can be loosened by use of combined wrench in the tool set. Take out handle (31), loosen left—hand nut (32) and the direction lock latch (33) and expansion ring (2).

Procedures for remounting are the reverse of the above in order. During remounting, care should be taken that the position of nut (32) and screw cover (4) as well as adjusting nut (15), ecentric busn assembly (26) are well adjusted.

3.Tripod (see Fig.21)

Straighten and pull out cotter pin (11), use combined wrench to loosen grooved nut (12), then pivot (8), handle (7), frout leg assembly (5) and toothed plate spring (10) can all be removed. After unscrew countersunk screw (9) by use of double—purpose wrench (1), toothed plate (14) and set ring (13) can all be dismounted. The procedure for remounting is the reverse of the above.

The method dismount left hind leg and righr hind leg is the same as that for the front leg.

4.Support ring for elevation mechanism (Fig.22)

Remove circlip (9), driving out cylindrical pin (3), take down handle (1), then left shaft (5) together with jack screw (2) and sole plate (6) can all be taken out from the inner middle frange of support ring (7). Jack screw (2) and left shaft (5) can be spearated from each other by an opposite twisting. Push the tight shaft (10) towards the bore of support ring (7) to removed it, this will cause support ring (7) to fall out from between the left and right support plates. In general, set pin (8) is not to be removed.

To remount, follow the above but in reverse order.

5.Conical shaft stand of gun barrel (see Fig.23)

After driving out cylindrical pin (2) and removeing handle (1), spindle (3) may be screwed out and screw plug (9) as well as washer (8) may be taken out.

Drive out cylindrical pin (4) through the bore (ordinarily, this pin should not be removed), use combined wrench in the tool set to loosen nut (5), then tubular shaft (6) can be drawn out from the other direction and cone seat (7) will fall out at the same tine. In ordinary, cylindrical pin (10) should not be dismounted.

Procedure for remounting is the reverse of the above. During remounting, care should be taken to well adjust the axial position of spindle (3).

6.Disasstmbly and assembly between elevation mechanism and support

ring (see Figs 19 and 22)

To separate them. first it is necessary to remove sealing gland (8) and sealing washer (7) in the top of the elevation mechanism then move set pin (8) of support ring (7) into the horizontal guide channel in the casing of elevation mechanism, Turn the casing of elevation mechanism so that set pin (8) reaches the end of the guide channel. In this position, the elevation mechanism can be pulled out from the bottom.

The procedure for rejointing is the reverse of the above.

Chapter 5 Maintenance , checking and remety

It is very important for maintaining fighting—ready condition by proper maintenance, regular chicking and trouble shocting.

I Maintenance and servicing

1. Maintain every part of the gun clean. As long as posible, keep the gun from rain hitting. If it is affected by rain, it is neccessary to dismantle it, wipe it dry and apply a thin layer of oil.

2. The surface phosphorized layer and alkaline oxidized layer must be applied with a thin layer of oil to prevent rusting.

3. It is not neccessary to apply oil on painted surfaces. but they have to be kept clean and the paint coating has to be prevented from being damaged. Never use gasoliline to wipe the external surface of the gun barrel to avoid scaling—off of the paint.

4. To prevent rusting, minimize friction and ensure free movement of mechanisms, oil should be applied frequently on front sihgt, front scale and optical foresight seat as well as holder—trigger block body, block arm, elevation mechanism support ring and barrel conical shaft stand.

5. The lube oil in elevation mechanism and direction mechanism should be changed at regular intervals (use mixture of 50% gun oil and 50% cannot oil. Under normal condition once half a year).

6. Afrer dissassembling and before reassembling, all parts must be applied with oil.

7. During marching, transportation and use. it is absolutely prohibited to allow the gun being bumped against. Special care should be taken to maintenance the gun barrel. front sight scale, optical foresight seat and holder— trigger. When not in use. front sight plate and front sight scale should be pressed down.

8. During disassembly and reassembly, never knock any part at will.

9. After firing, use warm water and soap, or alternatively, use kerosene

to clean the barrel and breech block, then apply with cannon oil wi machine oil.

10. If the gun is to be stored for relatively long time, all cylindrical spiral springs (such as firing pin spring) should be set into tensile condition to avoid their ineffecriveness.

11. During ordinary training, a thin rubber may be placed on the front end face of the firing pin to avoid fatique rupture of it due to repeated no — bullet trigering in rouine training. But special attention should be paid to removing it in advance before firing practice and battle.

II.Checking and remedy

1.Before firing, check that the inside of breechy and power chamber has been wiped clean. No powder fouling, sand or dust is allowed to deposit inside.

2.Check at regular intervals the correct junction between locking device. block body and block arm. block stopper, and the tightness of screws. The function of bullet case drawer spring, the positioning of damping spring sleeve and the effectiveness of damping spring are also to be check.If any defect is found, its cause must be identified and repair or replacement must be carried out.

3.Before firing, it is necessary to check the trigger device to see if the interlock of the trigger is reliable and the triggering motion is smooth.

The protrusion of the firing can be checked with the protrusion gauge, the normal protrusion of the firing tip is 2.26——2.62mm. To check, first open the breech block. prees down the bullet case drawer with the thumb of your hand. hold left handle with left hand and turn the block towards closing direction in positoin (45°), then use double—purpose wrench (or the thumb of right hand)to press down the safety tab of stop bar, push the spike of the stop bar leftward to trigger, the firing pin will protrude out and its protrusion mav be checked with protrusion gauge, After checking, turn the breech block towards opening direction for .45° and close the breech block.

The function of firing pin can be checked first by triggering and then by loosening the firing pin spring nut for an observation inside. It is also neccessary to check that the firing pin spring nut is tightened in position

and set pin of the nut is inserted into the notch.

The function of unsucceeded-block-closing safety, blodk closing safety hook, trigger safety lock and stop bar safety tab has also to be checked. Repair or replacement must be performed as neccessary.

4.Checking of optical foresight zero point, checking and rectifying of sighting zero line:The purpose of these is to have the sighting zero line parallel with the axis of the gun barrel when the firing angle and direction angle are set to zero on their graduated scales, and slso to have the barrel in level condition in longitudinal and cross directions when the air bobbles of the elevation datum and inclination datum are in the middle position, so as to have the bullet hit the target accutately no matter the gun is in direct or indirect laying. The procedure for these is as follows:

1) Zero point checking and rectification:

a).Mount the optical foresight onto the gun. Place the rectified quadrant on the inspection pad of the breech and adjust the gun barrel to real level condition in longitudinal and cross directions. If the barrel is not level in longitudinal direction, crank the elevation mechanism to set it level; if it is not level in cross direction, pad something under the leg at the lower side to make it level.

b). Set various parts of the optocal foresight to zero.

c). In this condition the air bobbles of the elevation datum and inclination datum should be in the middle position.If the air bobble of the inclination datum is not in middle position, turn the level adjusting screw on the optical foresight seat to adjust it to middlte position, then correct the mark lines on the lock pin and the socket that is, file away the original mark lines make new ones. If the air bobble of the elevation datum is not in middle positon, turn the knobs of the firing angle mechanism of the optical foresight to have it in middle and then adjust the firing angle graduation scale and auxiliaty graduation scale in the following way: loosen the nut on the knob of the firing angle mechanism. turn the graduation ring to set it at zero and retighten the nut. If the main graduation is not at zero, loosen the screw on the pointer, adjust, then retighten. After these, recheck that every thing meets the requirements. Having been set in the factory, this adjustment is not recommended to be alrered frequently by the user.

2) Checking and rectification of sighting zero line: The checking of sighting zero line may be performed in two ways,i.e., aiming point method and checking target method.

Aiming point method:

a) Select an isolated clear aimming point 600 meters away from the gun nuzzle.

b) Stick a graticule over the muzzle. Remove the firing pin spring nut, firing pin and firing pin spring. Remount the nut. Then perform sighting through the sighting hold of the nut. adjust the elevation and rirecting mechanisms to align the graticule and the aiming point.

c) Sight through optical foresight to see if the zero line coincides with the aiming point. If does'nt perform adjustment in the following way:

Without using elevation and direction mechanisms, turn the elecation knob of the optical foresight to perform adjustment. If the elevation is not correct, turn the elevatoin knob to correct it. Then check the zero point if it is coincided with the pointer. If not, loosen the screw on the knob, turn the graduation ring to have them coincided with each other then retighten the screw. If there is a deviation in direction, turn the direction know to correct it. If at this time the supplemental graduation is not zeroed. make adjustment in the above way. If main direction has a great error, loosen the screw on the supplemental direction graduation device. turn loose the pressing ring, adjust the main direction graduation ring and then retighten the pressing ring and the screw. After adjusting, recheck if all requirements are met. if there is still a deviating, make adjustment again until all equirements are met. During checking and rectification, if the error in elevation or supplemental direction does not exceed one mil, it is not neccessary to adjust.

Sighting disk method:

a) Place the gun on a flat area of ground in a fighting mode Use quadrant to adjust the gun into level condition horizontally and longitudinally.

b)Place the calibration target, which is made before hand, at 30 50 meters in front of the gun muzzle. Perform sighting through the small hold in the firing pin spring nut while moving the targe so that the graticule on the lower right of the target coincides with the gratiaule on the muzzle (Fig.42).

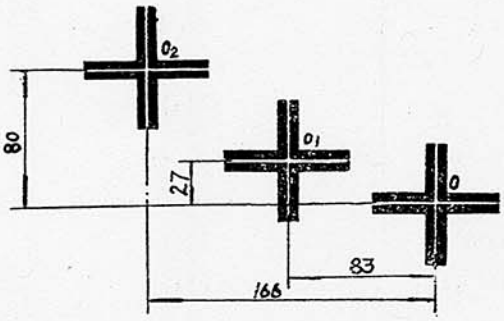


Fig.42 Calibration target
O:Center of muzzle
O_1:Aiming point of mechanical sighting gear
O_2:Aiming point of optical foresight

c) Sight through the aperture of the rear sight scale to check if the front sighr, the aperture and the center O_1 of the graticule are in the same straight line. If there is horizontal deviation, perfrom adjustment after loosening the screw at the aperture and then retighten; if there is deviation in the vertical direction, adjust the screw of the front sight using a screw driver so that the front sight, the aperture and the center O1 of the graticule are lined up (aiminh point method).

d) Sight through the optical foresight to check if pointO2 of the sighting disk (the center of graticule) aligns with zero line of the optical foresight. If not, it is neccessary to perform adjustment in the same way as described in c) of aiming point method.

Checking of backlash on sighting gear:

To check for backlash on directoin and elevation mechanisms, first perform aiming at a preselected aiming point 40 menters away by turning the direction and elevagion knobs, note down the readings of direction and elevation, slowly turn the knobs further for about one turn in the same direction, then turn the knobs reversely to aim at the same aiming point; check if the readings are the same as before; if not, the difference in graduation mils represents the backlash of the sighting gear. Repeat the procedure for three times and find out the averaged value. Should the averaged value exceed two mils the sighting gear should be sent back to the factory for repair.

5. At firing, if the support ring fails to lock the casing of elevation mechanism, it is necdessary to check for wear of the teeth on the sole plate inside the support ring and the wear of the slip-prevention teeth on the casing of elevation mechanism. If the teeth on the sole plate are nearly worn away, replace the sole plate.

6. If the spindle on tje conical shaft stand fails to lock the conical shaft of the barrel tightly or locks it too tight, it is neccessary to check for their wear or improper contact with each other. If neccessary, remove the handle on the spondle to adjust the axial position of the spindle by tyurning the latter.

7. If the backlash or play of the handwheel of the elevation mechanism is too large, it is neccessary to check for wear of the helical gear and to adjust the screw plug so that the backlash is acceptable. If neccessary, replace the helical gear.

8. In case where the handwheel of the direction mechanism is too tight or too loose for hand turning, or works loose, it is neccessary to check for looseness of the eccentric bush. Turning the eccentric busg clockwise makes it more tight thus larger torque for hand turning of the handwheel and vice versa.

9. If the direction lock latch fails to lock the direction mechanism, it is neccessary to check for wear and improper mounting of the direction lock latch as well as wear of the expansion ring. If neccessary, change the position of the handle of lock latch to adjust the relative positoin between the lock latch and the expansion ring.

10.In case where a vertical play is observed on the casing of directoin mechanism, the adjusting crown nut at the top of the vertical shaft should be checked for pressing condition. If it is not tight enough, tighten it.

11.If any handle fails to lock the corresponding leg of the tripod, it is neccessary to check if the handle and the leg fit well with each other. Tighten the nut to adjust the length of the shaft of toothed plate as necessary so that the handle locks the leg tightly.

III.Trouble shooting

To advoid trouble or to remove it in time, it is important before firing to inspect and wipe the gun, the accessories & tool set and ammunition.

Before checking for trouble, always remove the shell first. If a shell does not ignite, wait for one minute before removing it because the risk of delayed ignition. In case the gun barrel is too hot and the shell is difficult to be drawn out, clear of the rear of gun breech, wait for the temperature of the barrel to go down and then take measures to withdraw the shell. Never stay at the raer of gun breech for long time to avoid injury due to uncontrolled ignition The causes and remedies of troubles are listed below:

Cause and remedy of trouble

Trouble	Cause	Remedy
1. Difficult block closing	1. The movement of bullet case drawer is obstructeddue to the gun powder residue between the contactsurfaces of the block body, block seat, block arm and block stopper as well as in the "V" shape groove of the block body. 2. Damage or burn-out of the tip of slipped thread on the block body and block seat. 3. The shell is not loaded in position in the breech: The rifle lines on the bullet do not engafe with the rifle lines in the barrel: Powder residue depo sits on the inner surface of the positioning bore in the nozzle ring for the bullet case: Dirt on the bullet or bottom of bullet case. 4. Protruding of the primer out of the bullet case(not screwed in position).	1. Apply oil on related parts or dismantle for cleaning. 2. Remove the burrs using a small file 3. Reload the shell after wiping into the breech. If there is burr on the rifle lines of the shell, remove it with a smnall file. If the band of rifle lines is damaged, use a new shell. 4. Use the wrench for primer to turn it in position.
2.Fails to ignite	1. Too much oil sludge in the firing pin chamberthus slow movement of the firing pin; weakness of firing pin apring: Firing pin spring nut is not tightened in position. 2. Firing pin tip worn out thus insufficient protrusion 3. Primer retracts into the bottom of the b[illegible] case or defective primer.	1. Clean off the oil sludge; replace with a new spring in case ofspring failure: tighrn the firing pin spring nut in position. 2. Check the protcusion of firing pin. Replace with a new firing pin if the protrusion is too small. 3. Turn the primer flush with the bottom face of the bullet case.Close the breech block and then pull the trgger. If nitionstill not succeed, replace the primer or the shell with a new one.

Trouble	Cause	Remedy
3. Spontaneous ignition.	Failure of spring tightening pin thus the firing pin fails to retract while the block is opened. Bullet case expanded or cracked by explosion.	Send the gun back to repair workshop to replace the spring tightening pin. If the breech block can not be opened because of the expanded or cracked bullet case, never try to open it by force. Dismantle the breech block first and then take out the bullet case. Method to dismantle: After taking out the firing pin, unscrew the screw
4. Breech block can not be opened		On the block arm and remove the block arm, turn the block stopper backward and take ouh the bullet case drawer (bullet case drawing hook), then take out the block body. Check for expansion level. Use the stem of the barrel brush to bump into the breech block. If the block can be opened by thie method, never try to open it by force to avoid damage of other parts. In this case , the gun should be sent back to repair shop for trouble removal.
5. Bullet case can not be drawn out after the block is opened.	Failure of bullet case drawer spring or broken bullet case drawer.	Replace the bullet case drawer spring or the bullet case drawer.

Note: For trouble and remedy of gun mount, see related sections in Chapter 5.